CONDENSED CATALOGUES OF MECHANICAL EQUIPMENT

WITH
GENERAL CLASSIFIED DIRECTORY
AND
CONSULTING ENGINEERS' DIRECTORY

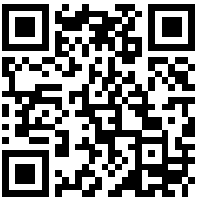
ELEVENTH ANNUAL VOLUME
1921

THE AMERICAN SOCIETY of MECHANICAL ENGINEERS

This is a reproduction of a library book that was digitized by Google as part of an ongoing effort to preserve the information in books and make it universally accessible.

Google™ books

https://books.google.com



Twin Cities Campus



Digitized by Google

Digitized by Google

Digitized by Google

CONDENSED CATALOGUES

OF

MECHANICAL EQUIPMENT

COMPRISING CONDENSED, UNIFORMLY PRESENTED AND ILLUSTRATED CATALOGUE INFORMATION COVERING THE PRODUCTS OF MANUFACTURERS OF VARIOUS CLASSES OF MECHANICAL EQUIPMENT

WITH

GENERAL CLASSIFIED DIRECTORY

A SPECIALIZED CROSS-INDEXED CLASSIFIED LIST OF MECHANICAL EQUIPMENT WITH THE NAMES AND ADDRESSES OF THE MANUFACTURERS

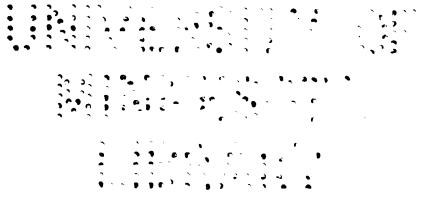
AND

CONSULTING ENGINEERS' DIRECTORY

A CLASSIFIED LIST OF MEMBERS OF THE AMERICAN SOCIETY OF MECHANICAL ENGINEERS ENGAGED IN VARIOUS BRANCHES OF CONSULTING ENGINEERING PRACTICE

ELEVENTH ANNUAL VOLUME

OCTOBER, 1921



Published Annually By

The American Society of Mechanical Engineers

29 West 39th Street, New York

Price $4.00 a copy. Issued free to every standing member of the Society of the year of publication. (Extra copies to members $3.00.)

Digitized by Google

UNIVERSITY OF
MINNESOTA
LIBRARY

Digitized by Google

PREFACE

THE Eleventh Annual (1921) Volume of A. S. M. E. CONDENSED CATALOGUES OF MECHANICAL EQUIPMENT is here placed at the service of the membership of the Society, and of the mechanical engineering profession at large.

It is most gratifying to observe the continued improvement in the character of the material published in the Catalogue Section. It is evident that manufacturers are coming to realize more and more clearly the requirements of the engineer for detailed information and for specific data in a reference work of this character, and it is believed that all concerned are to be congratulated on the progress which has been made in this respect in this edition of the CONDENSED CATALOGUES.

Attention is also directed to the title pages of the seven main divisions of the Catalogue Section. These pages supply an alphabetical list of the products catalogued in their respective groups, thus enabling the engineer to quickly find information concerning the equipment in question. For convenience the separate lists are combined in the Table of Contents, which gives a general survey of the material contained in the volume.

The general Mechanical Equipment Directory in which all eligible manufacturers have their products listed free of charge within reasonable limits, and the Consulting Engineers' Directory compiled from the membership of the Society, have again been extended and improved. It is believed that these reference features will prove of even greater value than heretofore.

The Directory Section is practically inclusive of all leading firms but the Society would be grateful if advised of any omissions of names, as we desire to make the Directory completely representative. Directions for using the Mechanical Equipment Directory are given at the beginning of that section.

The publication of the annual volume of A. S. M. E. CONDENSED CATALOGUES of MECHANICAL EQUIPMENT is essentially a coöperative undertaking in which the Society acts as a logical agent rather than as a publisher in the usual sense of the term. Acknowledgment is due to the many firms whose use of space has made it possible for the Society to furnish this convenient and useful reference work to the mechanical engineering profession, with the aim of affording a closer and more efficient point of contact between the user and the maker of mechanical equipment.

NOTE—All data presented have been edited with a view to the elimination of advertising claims or exaggerated statements and every effort made to restrict the Condensed Catalogues to firms of good standing only. Publication of catalogue data does not constitute in any sense an endorsement by the Society of the firms or products thus represented.

Extract from Constitution: C 55. The Society shall not be responsible for statements or opinions advanced in papers or in discussions.

305748

Digitized by Google

CONTENTS

PAGE

Alphabetical List of Firms Catalogued ..... X–XV

CATALOGUE SECTION

Data begins on page number given, as closely as can be divided.
Consult Directory Section (green pages) for specific products.

Part I: Power Plant Equipment 1

	PAGE		PAGE
Arches, Boiler	133	Grates	123
Baffle Walls	109	Heaters, Feed Water	146
Balanced Draft Systems	108	Hose	259
Blowers, Forced Draft	105	Injectors	217
Blowers, Soot	110	Insulating Materials, Heat	135
Boiler Fittings	101	Lubricants	251
Boiler Washer Systems (Locomotive)	145	Lubricators	248
Boilers, Steam	52	Motors, Electric	18
Burners, Oil	130	Oiling Systems	248
Chimneys	95	Packings	254
Coal Agitators	132	Pipe and Fittings	228
Condensation Return Systems	243	Piping, Power	234
Condensers	158	Piston Rings	246
Controllers, Temperature	222	Pulverized Coal Equipment	128
Cooling Towers	156	Refractory Materials	133
Coverings, Pipe	244	Regulators, Damper	206
Economizers, Fuel	96	Regulators, Feed Water	103
Ejectors	217	Regulators, Pressure	205
Engine Repairs	51	Regulators, Tank	219
Engines, Diesel	36	Separators, Oil	150
Engines, Gas	49	Separators, Steam	146
Engines, Oil	36	Spray Cooling Systems	164
Engines, Steam	4	Stokers	111
Filters, Oil	153	Superheaters, Steam	98
Gas Producer Plants	94	Traps, Steam	200
Gaskets	256	Turbines, Hydraulic	18
Generating Sets	19	Turbines, Steam	18
Generators, Electric	18	Valve Control	197
Governors, Engine	247	Valve Reseating Machines	198
Governors, Pump	205	Valves and Fittings	168
		Water Purifiers	140

Part II: Testing, Measuring and Recording Apparatus 263

Ammeters	291	Meters	273
Calorimeters	284	Production Recorders	291
Combustion (CO_2) Recorders	281	Pyrometers	291
Controllers	291	Recorders	273
Gage Testers	287	Regulators	291
Gages, Draft	284	Scales, Automatic	270
Gages, Pressure	287	Tachometers	292
Gages, Tank	297	Testing Machines	265
Gages, Vacuum	287	Thermometers	291
Gas Analysis Apparatus	282	Vibrometers	298
Indicators	281	Voltmeters	291
Indicators, Engine	288	Wattmeters	291
Laboratory Supplies	300	Weighing Machines	270
Liquid Level Recorders	293		

Part III: Power Transmission Machinery 301

Balls, Steel Bearing	350	Gears, Speed Reduction	304
Bearings	328	Hangers, Shaft	324
Bearings, Ball and Roller	340	Pillow Blocks	328
Belt Lacers	364	Power Transmission Machinery	304
Belting	360	Pulleys	319
Boxes, Hanger	328	Rope Drives	335
Bushings	336	Shafting	334
Chains, Power Transmission	320	Shafts, Flexible	359
Clutches	303	Sheaves	323
Controls, Flexible Wire	358	Speed Reducers (Gear)	304
Couplings	312	Transmissions	304
Gears	303		

Digitized by Google

CATALOGUE SECTION (Continued)

PAGE

Part IV: Conveying, Hoisting and Transporting Machinery 365

	PAGE		PAGE
Buckets, Conveying	370	Dumbwaiters	407
Buckets, Crane and Hoist	408	Elevators, Bucket	367
Cableways	388	Engines, Hoisting, Steam	383
Cars, Industrial	382	Hoists, Chain and Gear	402
Chains, Elevating and Conveying	370	Hoists, Drum	383
Chains, Loading	410	Hoists, Electric	394
Coal Mine Equipment	376	Hoists, Telescopic	406
Conveyors	367	Loaders, Portable	377
Cranes, Locomotive	383	Locomotives, Industrial Electric	374
Cranes, Traveling	394	Rope, Wire	409
Crushers and Pulverizers	376	Tractors, Industrial	382
Derricks	383	Tramrail Systems	390
Dispatch Tube Systems, Pneumatic	378	Trucks, Industrial	382
Dredging Machinery	388	Winches	384

Part V: Metals, Alloys and Other Materials 411

Alloys	413	Metals, Bearing	413
Babbitt Metal	416	Metals, Non-Ferrous	413
Brass and Brass Shapes	414	Solders	416
Bronzes	415	Stampings, Metal	434
Castings, Die	424	Steels, Alloy	421
Copper and Copper Shapes	414	Steels, Cold Drawn	421
Fibre, Vulcanized	417	Wire, Copper	414
Forgings	428		

Part VI: Metal Work Machinery, Machine Tools and Accessories 435

Abrasives	510	Nuts	522
Acetylene Generators	541	Ovens	534
Bolts	522	Oxygen Generating Plants	536
Boring Mills	467	Planers	469
Broaching Machines	461	Presses	437
Burners, Oil (Industrial)	530	Punching Machines	438
Chucks	512	Reamers	502
Clamps, Machine Table	515	Rivets	521
Cutters	503	Rolls, Forming	443
Die Heads	496	Saws	506
Die Sinking Machines	493	Screw Machine Products	518
Dies and Punches	505	Screw Machines	462
Drill Heads, Multi-spindle	500	Screw Thread Comparators	453
Drilling Machines	466	Screws	520
Drills	502	Shapers	470
Flanging Machines	445	Shearing Machines	440
Furnaces, Industrial	527	Slitting Machines	491
Gages	471	Slotting Machines	468
Gear Cutting Machines	472	Springs	519
Grinding Machines	484	Stamps, Steel	514
Grinding Wheels	510	Taps, Collapsing	498
Hammers, Power	438	Threading Machines	496
Hobs	503	Tools, Machinists'	508
Hydrogen Generating Plants	536	Welding Machines	537
Lathes	447	Wrenches	516
Milling Machines	477		

Part VII: Compressors, Blowers, Pumps, Hydraulic Machinery, Industrial Machinery, Steel Plate Work 543

Accumulators, Hydraulic	591	Paper Mill Machinery	646
Air Conditioning Apparatus	617	Paving Blocks	661
Blowers	553	Presses, Hydraulic	590
Boilers, Heating	622	Pumping Outfits	586
Brick Making Machinery	598	Pumps, Centrifugal	564
Carton Sealing Machinery	645	Pumps, Deep Well	569
Centrifugals	614	Pumps, Power	567
Clay Working Machinery	598	Pumps, Rotary	563
Compressors, Air	545	Pumps, Steam	562
Crushing Machinery	598	Pumps, Vacuum	559
Drafting Room Equipment	664	Refrigerating Machinery	628
Dredges, Hydraulic	588	Rolling Mill Machinery	641
Drying Apparatus	606	Salt Plants	613
Dust Collecting Systems	554	Sand-Blast Equipment	636
Evaporators	607	Screens, Perforated Metal	653
Exhausters	553	Steel Plate Construction	651
Fans	553	Tanks	650
Foundry Equipment	634	Textile Machinery	642
Grating	662	Tools, Pneumatic	546
Hydraulic Machinery	590	Valves, Hydraulic	589
Insulating Machinery	638	Wire Rope Machinery	639
Kilns	612	Wire Stranding Machinery	639
Oil Well Equipment	648		

DIRECTORY SECTION

Part I: Mechanical Equipment Directory (Green Pages) 665

Part II: Consulting Engineers' Directory (Yellow Pages) 901

Digitized by Google

ALPHABETICAL LIST OF FIRMS CATALOGUED

A

PAGE

Acme Die Casting Corp'n, Bush Terminal No. 5, Brooklyn, N.Y. 424
Allan, A. & Son, Harrison, N. J. 413
*Allington & Curtis Mfg. Co., Saginaw, Mich. 554
*Allis-Chalmers Mfg. Co., Milwaukee, Wis. . 28, 29
*American Blower Co., Detroit, Mich. 553
American Brass Co., Waterbury, Conn. 414
American Chimney Corp'n, 147 Fourth Ave., New York, N. Y. 95
American District Steam Co., North Tonawanda, N. Y. 242
*American Engineering Co., Philadelphia, Pa. 111
*American Forge & Machine Co., Canton, Ohio 430, 431
American Gas Furnace Co., Elizabeth, N.J. . 527
American Hoist & Derrick Co., St. Paul, Minn. 383
American Industrial Furnace Corp'n, 10 Post Office Square, Boston, Mass. 528
American Injector Co., Detroit, Mich. 217
American Insulating Machinery Co., Philadelphia, Pa. 638
American Manganese Bronze Co., Holmesburg, Philadelphia, Pa. 415
American Metal Hose Co., Waterbury, Conn. 262
*American Metal Treatment Co, Elizabeth, N. J. 535
American Metallic Packing Co., N. S., Pittsburgh, Pa. 254
American Pulley Co., 4200 Wissahickon Ave., Philadelphia, Pa. 322
American Screw Co., Providence, R. I. 520
American Steam Gauge & Valve Mfg. Co., Boston, Mass. 200, 201
American Steam Pump Co., Battle Creek, Mich. 562
American Tool & Machine Co., Boston, Mass. 614
American Vulcanized Fibre Co., Wilmington, Del. 417
Ames Iron Works Oswego, N. Y. 4
Andrews Steel Co., Newport, Ky. 421
Anthony Co., 138 West Ave., Long Island City, N. Y. 530
*Ashton Valve Co., 161 First St., Cambridge, Boston, Mass. 287
Atkins, E. C. & Co. (Inc.), Indianapolis, Ind. 506
Atlas Crucible Steel Co., Hanna Bldg., Cleveland, Ohio 422
Atlas Press Co., 2000 N. Pitcher St., Kalamazoo, Mich. 437
Atmospheric Conditioning Corp'n, 435 Chestnut St., Philadelphia, Pa 617
Auburn Ball Bearing Co., 22 Elizabeth St., Rochester, N. Y. 340
Automatic Carbonic Machine Co., Peoria, Ill. 628
Automatic Furnace Co., Dayton, Ohio . . 112, 113
Automatic Products Corp'n, 199–203 Eighth St., Long Island City, N. Y. 518
Automatic Refrigerating Co., Hartford, Conn. 629

B

*Babcock & Wilcox Co., 85 Liberty St., New York, N. Y. 52, 53, 54, 55
*Bacharach Industrial Instrument Co., Pittsburgh, Pa. 279
Badenhausen, Phillips, 1425 Chestnut St., Philadelphia, Pa. 56
*Badger, E. B. & Sons Co., 75 Pitts St., Boston, Mass. 164
*Bailey Meter Co., 2009 East 46th St., Cleveland, Ohio 280
Baker R. & L. Co., Cleveland, Ohio. 382
Barber-Colman Co., Rockford, Ill. 474, 475
Barco Mfg. Co., Chicago, Ill. 240
Barnes, Wallace Co., Bristol, Conn. 519
*Barnhart Brothers & Spindler, Monroe & Throop Sts., Chicago, Ill. 425

PAGE

Bartlett, C. O. & Snow Co., Cleveland, Ohio 367
Bass Foundry & Machine Co., Fort Wayne, Ind. 57
Bastian-Blessing Co., 125 W. Austin Ave., Chicago, Ill. 539
*Bayer Steam Soot Blower Co., 4056 Park Ave., St. Louis, Mo. 110
Beach-Russ Co., 50 Church St., New York, N. Y. 560
Bearings Co. of America, Lancaster, Pa. 341
*Beaumont, R. H. Co., 340 Arch St., Philadelphia, Pa. 368, 369
Bernitz Furnace Appliance Co., 15 State St., Boston, Mass. 133
Bertsch & Co., Cambridge City, Ind. 442
*Best, W. N. Furnace & Burner Corp'n, 11 Broadway, New York, N. Y 130, 531
Biddle, James Co., 1211–1213 Arch St. Philadelphia, Pa. 298
*Bigelow Co., 76 River St., New Haven, Conn. 58
Biggs Boiler Works Co., Case Ave., & Newton St., Akron, Ohio 650
Blackmer Rotary Pump Co., Petoskey, Mich. 563
Blake & Johnson Co., Waterbury, Conn. 491
Blanchard Machine Co., Cambridge 39, Mass 484
*Bliss, E. W. Co., Brooklyn, N. Y. 438, 439
Bonnot Co., Canton, Ohio 598
Bound Brook Oil-Less Bearing Co., Bound Brook, N. J. 336
Box, Alfred & Co. (Inc.), Philadelphia, Pa. . 394
Bradley, C. C. & Son (Inc.), Syracuse, N. Y. . 446
*Braun, C. F. & Co., San Francisco, Cal. 156, 157
*Bristol Co., Waterbury, Conn. 291
*Brown, A. & F. Co., 79 Barclay St., New York, N. Y. 303
*Brown Hoisting Machinery Co., Cleveland, Ohio 390
Brown Instrument Co., Philadelphia, Pa. 292
Brown & Sharpe Mfg. Co., Providence, R. I. 477
Brownell Co., Dayton, Ohio 59
Bryant Chucking Grinder Co., Springfield, Vt. 485
Buckeye Iron & Brass Works, Dayton, Ohio 168
Budd Grate Co., 2013 E. Letterly St., Philadelphia, Pa. 123
Builders Iron Foundry, Providence, R. I. 277
Bunting Brass & Bronze Co., 720 Spencer St., Toledo, Ohio 337
Burroughs, Charles Co., Newark, N. J. 590
Bury Compressor Co., 1701 Cascade St., Erie, Pa. 545
Busch-Sulzer Bros.-Diesel Engine Co., St. Louis, Mo. 36

C

*Caldwell, H. W. & Son Co., 17th St. & Western Ave., Chicago, Ill. 370
*Caldwell, W. E. Co., 340 East Brandeis St., Louisville, Ky. 323
Carbondale Machine Co., Carbondale, Pa. 630
Carey, Philip Co, Cincinnati, Ohio 245
*Carrier Engineering Corp'n, 39 Cortlandt St, New York, N. Y. 620
*Casey-Hedges Co., Chattanooga, Tenn. . . . 60, 61
Cash, A. W. Co. Decatur, Ill. 205
*Celite Products Co., 11 Broadway, New York, N. Y. 135
*Central Foundry Co., 90 West St., New York, N. Y. 228
Chambers Brothers Co., Philadelphia, Pa. . 599
Champion Rivet Co., Cleveland, Ohio. 521
Chicago Pneumatic Tool Co., 6 E. 44th St., New York, N. Y. 548
Chicago Pulley & Shafting Co., 30 S. Clinton St., Chicago, Ill. 324, 325
Clarage Fan Co., Kalamazoo, Mich. . . . 556, 557
Cleveland Automatic Machine Co., Cleveland, Ohio 462
Cleveland Twist Drill Co., Cleveland, Ohio. 502
Cleveland Worm & Gear Co., Cleveland, Ohio 306

*Advertisements of firms marked * appear in "Mechanical Engineering"* x

Digitized by Google

PAGE

Clow, James B. & Sons, 534 So. Franklin St., Chicago, Ill. 230, 231
Coatesville Boiler Works, Coatesville, Pa. 62
Colburn Machine Tool Co., Cleveland, Ohio. 466, 467
*Cole, R. D Mfg. Co., Newnan, Ga. 63
Columbus Bolt Works Co., Columbus, Ohio 522
Connellsville Mfg. & Mine Supply Co. Connellsville, Pa. 384
Connery & Co. (Inc.), Second & Luzerne Sts., Philadelphia, Pa. 651
*Continental Fibre Co., Newark, Del. 418
Conveying Weigher Co., 90 West St., New York, N. Y. 371
Cook, A. D. (Inc.), Lawrenceburg, Ind. 585
Cook's, Adam Sons, 708–10 Washington St., New York, N. Y. 251
*Cooling Tower Co. (Inc.), 15 John St., New York, N. Y. 165
Coppus Engineering & Equipment Co., 342–348 Park Ave., Worcester, Mass. 104, 105
*Cramp, Wm. & Sons Ship & Engine Bldg. Co., Richmond & Norris Sts., Philadelphia, Pa. 30, 31
*Crane Co., 836 So. Michigan Ave., Chicago, Ill. 170, 171, 172, 173
*Crescent Refractories Co., Curwensville, Clearfield Co., Pa. 136
*Crosby Steam Gage & Valve Co., 40 Central St., Boston, Mass. 202, 288

D

Davidson, M. T. Co., 154 Nassau St., New York, N. Y. 565
Davis & Furber Machine Co., North Andover, Mass. 642
Dayton-Dowd Co., Quincy, Ill. 566
Dean, Payne (Ltd.), 103 Park Ave., New York, N. Y. 197
*De Laval Steam Turbine Co., Trenton, N. J. 22
*De La Vergne Machine Co., 1123 E. 138th St., New York, N. Y. 40
Delaware Hard Fibre Co. Wilmington, Del. 419
Deming Co., Salem, Ohio. 567
D'Este, Julian Co., 26 Canal St., Boston, Mass. 206, 207
Detroit Oak Belting Co., Detroit, Mich. 360
Detroit Stoker Co., Detroit, Mich. 114, 115
Devine, J. P. Co., 1375 Clinton St., Buffalo, N. Y. 606, 607
*Diamond Chain & Mfg. Co., Indianapolis, Ind. 320
Diamond Expansion Bolt Co., 90 West St., Cor. Cedar, New York, N. Y. 524
Diamond State Fibre Co., Bridgeport, Pa. 420
Dill, T. C. Machine Co. (Inc.), Philadelphia, Pa. 468
Dodge Sales & Engineering Co., Mishawaka, Ind. 42, 43, 326, 327, 328, 329
*Doehler Die-Casting Co., Brooklyn, N. Y. 426
Dole Valve Co., 1923–33 Carroll Ave., Chicago, Ill. 226
*Dougherty, M. J. Co., 25th & Washington Ave., Philadelphia, Pa. 234
Dove-Smith & Son, Niagara Falls, N. Y. 492
Drake Lock-Nut Co., East 75th & Stanton Ave., Cleveland, Ohio. 523
Drake Non-Clinkering Furnace Block Co., 5 Beekman St., New York, N. Y. 134
Drying Systems (Inc.), 11 So. Desplaines St., Chicago, Ill. 618, 619
Dunham, C. A. Co., 230 East Ohio St., Chicago, Ill. 227
Du Vivier, Ernest H., 30 Church St., New York, N. Y. 270

E

Eckenroth Valve & Mfg. Co., 156–158 Conarroe St., Manayunk, Philadelphia, Pa. 169

PAGE

Economy Pumping Mchy. Co., 104–118 N. Curtis St., Chicago, Ill. 568
*Edge Moor Iron Co., Edge Moor, Del. 65
Ehret Magnesia Mfg. Co., Valley Forge, Pa. 245
Electric Tachometer Corp'n, Philadelphia, Pa. 299
Electrolabs Co., Pittsburgh, Pa. 536
Ellicott Machine Corp'n, Baltimore, Md. 588
*Ellis, W. E. Co., Haverhill, Mass. 132
Elmes, Charles P. Engineering Works, 215 N. Morgan St., Chicago, Ill. 591
Engberg's Electric & Mechanical Works, 18 Vine St., St. Joseph, Mich. 6, 7
*Engineer Co., 17 Battery Place, New York, N. Y. 108, 109
Erie Ball Engine Co., Pittsburgh, Pa. 5
*Erie City Iron Works, Erie, Pa. 66, 67
Erie Engine Works, Erie, Pa. 8
*Ever Tyte Piston Ring Division, Walter A. Zelnicker Supply Co., 1600 Kingsland Ave., St. Louis, Mo. 246

F

Fairbanks Co., 416 Broome St., New York, N. Y. 174, 175
Fairbanks-Morse & Co., 900 S. Wabash Ave., Chicago, Ill. 41
Falk Corp'n, Milwaukee, Wis. 304, 305
*Falls Clutch & Machinery Co., Cuyahoga Falls, Ohio. 330
Farrar & Trefts, Buffalo, N. Y. 652
*Fawcus Machine Co., 2818 Smallman St., Pittsburgh, Pa. 307
*Fellows Gear Shaper Co., Springfield, Vt. 472, 473
*Files Engineering Co. (Inc.), Providence, R. I. 122
Fisher Governor Co., Marshalltown, Iowa. 208
Flexible Steel Lacing Co., 4638 Lexington St., Chicago, Ill. 364
Flynn & Emrich Co., Baltimore, Md. 121
*Foote Bros. Gear & Machine Co., 213–23 N. Curtis St., Chicago, Ill. 308, 309
Ford Chain Block Co., Second & Diamond Sts., Philadelphia, Pa. 404
*Ford Regulator Corp'n, 402 Broome St., New York, N. Y. 176
Foster Engineering Co., Newark, N. J. 209
*Foxboro Co. (Inc.), Foxboro, Mass. 293
*France Packing Co., Tacony, Philadelphia, Pa. 255
Franklin Machine Co., P O. Box 1393, Providence, R. I. 9
Franklin Mfg. Co., Franklin, Pa. 245
Frederick Engineering Co., Frederick, Md. 116
Frost Mfg. Co., 112 W. Adams St., Chicago, Ill. 68, 634
*Fuller-Lehigh Co., Fullerton, Pa. 128
Fulton Co., Knoxville, Tenn. 218, 219
Fulton Iron Works Co., St. Louis, Mo. 37

G

Galland-Henning Mfg. Co., Milwaukee, Wis. 592
*General Electric Co., Schenectady, N. Y. 18, 19, 20, 21
Geometic Tool Co., New Haven, Conn. 498, 499
Geuder, Paeschke & Frey Co., Western Valley, Milwaukee, Wis. 434
*Gifford-Wood Co., Hudson, N. Y. 372
Gillis & Geoghegan, 543 W. Broadway, New York, N. Y. 406
Glasgow Iron Co., Pottstown, Pa. 99
*Goetze Gasket & Packing Co., 11 Allen Ave., New Brunswick, N. J. 256
Goodrich, B. F. Rubber Co., Akron, Ohio. 258, 259
*Goulds Mfg. Co., Seneca Falls, N. Y. 570, 571, 572, 573
*Green Fuel Economizer Co., Beacon, N. Y. 96, 97
*Greene, Tweed & Co., 109 Duane St., New York, N. Y. 250

*Advertisements of firms marked * appear in "Mechanical Engineering"*

Digitized by Google

PAGE

Griebel Instrument Co., Carbondale, Pa.... 300
*Gwilliam Co., 23 Flatbush Ave., Brooklyn, N. Y.....356, 357, 358

H

*H. S. B. W.-Cochrane Corp'n, Philadelphia, Pa.....146, 147
Hastings Pavement Co., 25 Broad St., New York, N. Y..... 661
Hays, Jos. W. Corp'n, 104 E. Eighth St., Michigan City, Ind..... 282
*Heald Machine Co., Worcester, Mass....486, 487
*Heine Boiler Co., St. Louis, Mo.....70, 71
*Hendrick Mfg. Co., Carbondale, Pa..... 653
Hercules Machine & Tool Co. (Inc.), Broome & Lafayette Sts., New York, N.Y. 476
*Hill Clutch Co., Cleveland, Ohio..... 331
Hobson, Russell B., 120 Broadway, New York, N. Y..... 243
Hoggson & Pettis Mfg. Co., New Haven, Conn.....512, 513, 514
Holmes, Robt. & Bros. (Inc.), Danville, Ill.....386, 387
*Homestead Valve Mfg. Co., P.O. Box 1754, Pittsburgh, Pa..... 177
Honhorst, Jos. Co., 1016–20 W. 6th St., Cincinnati, Ohio..... 654
Hooven, Owens, Rentschler Co., Hamilton, Ohio..... 10
Hope Engineering & Supply Co., Mt. Vernon, Ohio..... 49
Hulson Grate Co., Keokuk, Iowa.....124, 125
Hunt, C. W. Co. (Inc.), West New Brighton, Staten Island, N. Y.....374, 375
Hyatt Roller Bearing Co., New York, N.Y. 342, 343
Hydraulic Press Mfg. Co., Mount Gilead, Ohio..... 593

I

*Illinois Engineering Co., Chicago, Ill. ..210, 211
Illinois Malleable Iron Co., 1801–25 Diversey Parkway, Chicago, Ill..... 241
*Illinois Stoker Co., Alton, Ill..... 117
Illinois Tool Works, 154 E. Erie St., Chicago, Ill..... 503
Industrial Works, Bay City, Mich.....392, 393
Ingersoll Milling Machine Co., Rockford, Ill.....478, 479
*Ingersoll-Rand Co., 11 Broadway, New York, N. Y.....546, 547
*Ingersoll-Rand Co. (A. S. Cameron Steam Pump Works), 11 Broadway, New York, N. Y..... 564
International Engineering Works (Inc.), Framingham, Mass.....72, 73
International Machine Tool Co., 1124 West 21st St., Indianapolis, Ind.....448, 449
Irving Iron Works Co., Third Street & Dutchkill St., Long Island City, N. Y... 662

J

*James, D. O. Mfg. Co., 1114–1124 W. Monroe St., Chicago, Ill.....310, 311
Jarecki Mfg. Co., Erie, Pa.....178, 179
Jeffrey Mfg Co., 904 North Fourth St., Columbus, Ohio.....376, 377
*Jenkins Bros., 80 White St., New York, N. Y.....180, 181
*Johns-Manville (Inc.), New York, N. Y. .. 244
Johnson Bronze Co., New Castle, Pa. 338
*Johnson, Carlyle Machine Co., Manchester, Conn..... 332
Johnson Service Co., Milwaukee, Wis., 220, 221
*Jolly, J. & W., Holyoke, Mass..... 32
*Jones, W. A. Foundry & Machine Co., 4451 West Roosevelt Road, Chicago, Ill. 312, 313, 314, 315
*Jones & Lamson Machine Co., Springfield, Vt..... 450, 451, 452, 453, 454

PAGE

K

Kearney & Trecker Co., Milwaukee, Wis.... 480
Keasbey & Mattison Co., Ambler, Pa..... 245
*Keeler, E. Co., Williamsport, Pa..... 69
Keller Mechanical Engraving Co., 68 Washington St., Brooklyn, N. Y..... 493
Kelly & Jones Co., Greensburg, Pa.....182, 183
Kempsmith Mfg. Co., Milwaukee, Wis. 481
*Kerr Turbine Co., Wellsville, N. Y..... 23
Kewanee Boiler Co., Kewanee, Ill. .622, 623, 624
Key Boiler Equipment Co., 27th & McCasland Ave., East St. Louis, Ill.....100, 101
Kidwell Boiler & Engineering Co., 288 East Water St., Milwaukee, Wis..... 74
*Kieley & Mueller (Inc.), 34 West 13th St., New York, N. Y..... 212
*King Refractories Co. (Inc.), 1709 Niagara St., Buffalo, N. Y..... 137
Koven, L. O. & Brother, 154 Ogden Ave., Jersey City, N. J..... 605
Krause, Arthur E., Mountain Lakes, N. J. 153
Kroeschell Bros. Co., 460 West Erie St., Chicago, Ill..... 75

L

*Ladd, George T. Co., First National Bank Bldg., Pittsburgh, Pa.....76, 77
Lakeside Forge Co., Erie, Pa..... 429
*Lammert & Mann Co., Wood & Walnut Sts., Chicago, Ill..... 561
Lamson Co., 100 Boylston St., Boston, Mass.....378, 379
Lancaster Iron Works (Inc.), Lancaster, Pa.....656, 657
Landis Machine Co. (Inc.), Waynesboro, Pa.....496, 497
Landis Tool Co., Waynesboro, Pa..... 488
Larner-Johnson Valve & Engrg. Co., Widener Bldg., Philadelphia, Pa..... 589
Lasker Iron Works, 3201 South Lincoln St., Chicago, Ill..... 655
Leavitt Machine Co., Orange, Mass.....198, 199
Lebanon Boiler Works, 6 So. 15th St., Philadelphia, Pa.....78, 79
*Leffel, James & Co., Springfield, Ohio 33
Leslie Co., Lyndhurst, N. J..... 213
Liberty Machine Tool Co., Hamilton, Ohio 469
*Lidgerwood Mfg. Co., 96 Liberty St., New York, N. Y..... 388
*Lockett, A. M. & Co., New Orleans, La..... 131
Lonergan, J. E. Co., 211–215 Race St., Philadelphia, Pa.....203, 289
*Long & Allstatter Co., Hamilton, Ohio. .440, 441
Loomis-Manning Filter Distributing Co., 1439 So. 37th St., Philadelphia, Pa. 140
Louisville Drying Mchy. Co., Louisville, Ky..... 608
Lowell Wrench Co., 54 Commercial St., Worcester, Mass..... 516
Luitwieler Pumping Engine Co., Rochester, N. Y..... 569
Lumen Bearing Co., Buffalo, N. Y..... 416
*Lunkenheimer Co., Cincinnati, Ohio..... .....184, 185, 186, 187, 188, 189
Lynchburg Foundry Co., Lynchburg, Va. .. 229

M

McCabe Mfg. Co., Lawrence, Mass..... 445
McClave-Brooks Co., Scranton, Pa..... 126
McGowan, John H. Co., Cincinnati, Ohio.....574, 575
McIntosh & Seymour Corp'n, Auburn, N. Y. 38
*Magnesia Association of America, Bulletin Bldg., Philadelphia, Pa..... 245
Malleable Iron Fittings Co., Branford, Conn..... 236
Manistee Iron Works Co., Manistee, Mich. 158, 576
Marchant, Geo. F. Co., 1420–28 S. Rockwell St., Chicago, Ill..... 505

Digitized by Google

ALPHABETICAL LIST OF FIRMS CATALOGUED

PAGE

Maris Bros (Inc.), 5546 Grays Ave., Philadelphia, Pa. ... 395
Mason Regulator Co., Boston, Mass. ... 214, 215
*Maxon Furnace & Engineering Co., Muncie, Ind. ... 532, 533
Meachem Gear Corp'n, Canal St. & West Shore Railroad, Syracuse, N. Y. ... 318
*Medart Patent Pulley Co., St. Louis, Mo. ... 333
Metaline Co., West Ave., near Borden, Long Island City, N. Y. ... 339
Metalwood Mfg. Co., Detroit, Mich. ... 594
Milburn, Alexander Co., Baltimore, Md ... 540
Millholland Machine Co., Indianapolis, Ind. 455
Milwaukee Die Casting Co., 297 Fourth St., Milwaukee, Wis. ... 427
Milwaukee Reliance Boiler Works, Milwaukee, Wis. ... 148
Mono Corporation of America, 25 W. Broadway, New York, N. Y. ... 283
*Moore Steam Turbine Corp'n, Wellsville, N. Y. ... 24, 25
Morris, Herbert (Inc.), 1–15 Lawrence Place, Buffalo, N. Y. ... 402
*Morris Machine Works, Baldwinsville, N. Y. ... 578, 579
Morrison Bros., Dubuque, Iowa ... 658
*Morse Chain Co., Ithaca, N. Y. ... 321
Moto Meter Co. (Inc.), Long Island City, N. Y. ... 294
Mueller Metals Co., Port Huron, Mich. ... 428
*Murphy Iron Works, Detroit, Mich. ... 118
Murray Iron Works Co., Burlington, Iowa. 80, 81

N

Nason Mfg. Co., 71 Fulton St., New York, N. Y. ... 216
National Acme Co., Cleveland, Ohio. ... 464, 465
National Boiler Washing Co., Railway Exchange, Chicago, Ill. ... 145
*National Meter Co., 299 Broadway, New York, N. Y. ... 273
National Pipe Bending Co., New Haven, Conn. ... 150, 151
National Supply Co., Toledo, Ohio. ... 648, 649
National Tool Co., Cleveland, Ohio. ... 504
Nelson-Blanck Mfg. Co., 1662 Dubois St., Detroit, Mich. ... 500, 501
*Nelson Valve Co., Chestnut Hill, Philadelphia, Pa. ... 190
Neptune Meter Co., 50 E. 42nd St, New York, N. Y. ... 274
New Britain Machine Co, New Britain, Conn. ... 463
Newburgh Steam Boiler Works, Newburgh, N. Y. ... 64
New Departure Mfg. Co., Bristol, Conn. 344, 345
New England Butt Co., Providence, R. I. ... 639
New England Wire Machinery Co., New Haven, Conn. ... 640
Newhall Chain Forge & Iron Co., 90 West St., New York, N. Y. ... 410
New Jersey Foundry & Machine Co., 90 West St., New York, N. Y. ... 396
New London Ship & Engine Co., Groton, Conn. ... 39
New York Blower Co., Chicago, Ill. ... 555
New York Central Iron Works Co. (Inc.), North Middleburg Road, Hagerstown, Md. ... 659
New York Engineering Co., 2 Rector St., New York, N. Y. ... 82
New York Rubber Co., 34 Reade St., New York, N. Y. ... 260, 261
Niagara Machine & Tool Works, Buffalo, N. Y. ... 443
Niles-Bement-Pond Co., 111 Broadway, New York, N. Y. ... 470
Noble & Westbrook Mfg. Co., Hartford, Conn. ... 494
Nordberg Mfg. Co., Milwaukee, Wis. ... 11
Norma Co of America, Anable Ave., Long Island City, N. Y. ... 351
*Northern Engineering Works, Detroit, Mich. 397

PAGE

Northern Equipment Co., Erie, Pa. ... 102
Northern Fire Apparatus Co., 2434 University Ave., S. E., Minneapolis, Minn. ... 577
Norton Co., Worcester, Mass. ... 489, 510
Novo Engine Co., Lansing, Mich. ... 586, 587

O

*O'Brien, John Boiler Works Co., St. Louis, Mo. ... 83
Ohio Locomotive Crane Co., Grace St., Bucyrus, Ohio. ... 391
Oil City Boiler Works, Oil City, Pa. ... 84
Oilgear Co., 60–62–64 27th St., Milwaukee, Wis. ... 483
Oil & Waste Saving Machine Co, 1509 Real Estate Trust Bldg., Philadelphia, Pa. ... 615
Olmstead, A. E. & Sons, Pulaski, N. Y. ... 50
Olsen, Tinius Testing Machine Co., 500 N. 12th St., Philadelphia, Pa. ... 265, 266, 267
Open Coil Heater & Purifier Co., Indianapolis, Ind. ... 149
Ottumwa Iron Works (Inc.), Ottumwa, Iowa ... 385
Oven Equipment & Mfg. Co., New Haven, Conn. ... 534

P

Page Boiler Co., 817 Larrabee St., Chicago, Ill. ... 85
*Pangborn Corp'n, P. O. Box 859, Hagerstown, Md. ... 636, 637
*Pawling & Harnischfeger Co., Milwaukee, Wis. ... 398
Pease, C. F. Co., 843 North Franklin St., Chicago, Ill. ... 664
Pelton Water Wheel Co., 1982 Harrison St., San Francisco, Cal. ... 34, 35
Perkins, B. F. & Sons (Inc.), Holyoke, Mass. ... 558
*Permutit Co., 440 4th Ave., New York, N. Y. ... 141
Philadelphia Drying Machinery Co., Philadelphia, Pa. ... 610
Pickering Governor Co., Portland, Conn. ... 247
Pierce, Butler & Pierce Mfg. Corp'n, 437 East 162nd St., New York, N. Y. ... 204
Pittsburgh Meter Co., East Pittsburgh, Pa. ... 275
Pittsburgh Valve, Foundry & Construction Co., P. O. Box 1016, Pittsburgh, Pa. ... 192, 193
Pneumercator Co. (Inc.), 15 Park Row, New York, N. Y. ... 297
Poole Engineering & Machine Co., Woodberry, Baltimore, Md. ... 316, 317
Porter-Cable Machine Co., Syracuse, N. Y. 460
*Powers Regulator Co., 995 Architects Bldg., New York, N. Y. ... 222, 223
Pratt & Whitney Co., 111 Broadway, New York, N. Y. ... 471
*Precision Instrument Co., Newark, N. J. 284, 285
Prescott Co., Menominee, Mich. ... 580
Providence Engineering Corp'n, Providence, R. I. ... 12
Pusey & Jones Co., Wilmington, Del. ... 269

Q

Quasi-Arc Weldtrode Co. (Inc.), 114 Hudson Ave., Peekskill, N. Y. ... 538
Quickwork Co., St. Marys, Ohio ... 444
*Quigley Furnace Specialties Co. (Inc.), 26 Cortlandt St., New York, N. Y. ... 129, 138, 139

R

*Reading Chain & Block Corp'n, Reading, Pa. ... 403
*Reading Valve & Fittings Co. (Pratt & Cady Division), Hartford, Conn. ... 194, 195
*Reading Valve & Fittings Co. (Reading Division), Reading, Pa. ... 238, 239

Digitized by Google

PAGE

*Reed & Prince Mfg. Co., Worcester, Mass... 524
Reeves Pulley Co., Columbus, Ind..... 319
Refinite Co., Refinite Bldg., Omaha, Neb... 142
Reliance Weighing Machine Division, Stearns Motor Mfg. Co., Ludington, Mich..... 271
*Republic Flow Meters Co., 2240 Diversey Parkway, Chicago, Ill..... 281
*Richardson-Phenix Co., 126 Reservoir Ave., Milwaukee, Wis.....248, 249
Riehlé Bros. Testing Machine Co., 1424 N. Ninth St., Philadelphia, Pa..... 268
*Riley, Sanford Stoker Co. Worcester, Mass..... 119
Robertson, John & Co., 133 Water St., Brooklyn, N. Y..... 595
Robins Conveying Belt Co., Park Row Bldg., New York, N. Y..... 373
*Rockwell, W. S. Co., 50 Church St., New York, N. Y..... 529
*Roebling's, John A. Sons Co., Trenton, N. J..... 409
Rossendale-Reddaway Belting & Hose Co., Newark, N. J..... 361
*Royersford Fdry. & Machine Co. (Inc.), 52 North 5th St., Philadelphia, Pa....346, 347
Royle, John & Sons, Paterson, N. J..... 643
Ruggles-Coles Engineering Corp'n, 120 Broadway, New York, N. Y..... 609
Russell, Burdsall & Ward Bolt & Nut Co, Port Chester, N. Y..... 525

S

"S-C" Regulator Mfg. Co., Fostoria, Ohio.. 103
S K F Industries (Inc.), 165 Broadway, New York, N. Y.....348, 349, 350
Sandusky Foundry & Machine Co., Sandusky, Ohio..... 646
*Sarco Co. (Inc.), 9 Barclay St., New York, N. Y.....224, 225
*Scaife Wm. B. & Sons Co., Oakmont, Pa.....143, 660
*Schaeffer & Budenberg Mfg. Co., Brooklyn, N. Y..... 295
Schieren, Chas. A. Co., 30–38 Ferry St., New York, N. Y.....362, 363
*Schutte & Koerting Co., 1184 Thompson St., Philadelphia, Pa..... 159
Scott Valve Mfg. Co., Detroit, Mich..... 191
*Sedgwick Machine Works, 146 W. 15th St., New York, N. Y..... 407
*Shepard Electric Crane & Hoist Co., Montour Falls, N. Y.....400, 401
Silumite Products Corp'n, 1410 Morris Bldg., Philadelphia, Pa..... 663
Simmons Pipe Bending Works, 40 Mechanic St., Newark, N. J..... 235
Simonds Mfg. Co., Fitchburg, Mass..... 507
Simplex Valve & Meter Co., Philadelphia, Pa..... 278
Sims Co., Erie, Pa..... 152
Skinner Bros. Mfg. Co. (Inc.), 1400–1490 Vandevanter Ave., St. Louis, Mo..... 621
Skinner Engine Co., Erie, Pa..... 13
Smalley-General Co. (Inc.), Bay City, Mich..... 482
*Smidth, F. L. & Co., 50 Church St., New York, N. Y..... 604
Smith Gas Engineering Co., Dayton, Ohio.. 94
*Smith, H. B. Co., Westfield, Mass.....626, 627
Smith, Samuel & Son Co., Paterson, N. J.... 88
Smith's Inventions (Inc.), 2633 4th St., S. E., Minneapolis, Minn..... 541
Spencer Turbine Co., Hartford, Conn..... 552
*Spray Engineering Co., 60 High St., Boston, Mass.....166, 167
*Springfield Boiler Co., Springfield, Ill.....86, 87
Standard Conveyor Co., North St. Paul, Minn..... 380
Standard Sand & Machine Co., 5151 St. Clair Ave., Cleveland, Ohio..... 635
Standard Shop Equipment Co., 23rd St. and Hunting Park Ave., Philadelphia, Pa. 515
Standard Steel & Bearings (Inc.), 366 Madison Ave., New York, N. Y..... 354

PAGE

Standard Water Systems Co., Hampton, N. J..... 144
*Starrett, L. S. Co., Athol, Mass..... 508
Steacy-Schmidt Mfg. Co., York, Pa 612
Steinle Turret Machine Co., Madison, Wis. 447
Sterling Grinding Wheel Co., Tiffin, Ohio... 511
Stockham Pipe & Fittings Co., Birmingham, Ala..... 237
Stuebner, G. L. Iron Works, Hancock St., Long Island City, N. Y..... 408
Sturtevant, B. F. Co., Hyde Park, Boston, Mass..... 106
Sturtevant Mill Co., Harrison Square, Boston 22, Mass.....600, 601
Sullivan Machinery Co., 120 So. Michigan Ave., Chicago, Ill..... 549
*Superheater Co., 17 E. 42nd St., New York, N. Y..... 98
Swenson Evaporator Co., 945 Monadnock Bldg., Chicago, Ill..... 611

T

*Taber Pump Co., 291 Elm St., Buffalo, N. Y..... 581
Tagliabue, C. J. Mfg. Co., 18–88 Thirty-Third St., Brooklyn, N. Y..... 296
Taylor Machine Co., 310 S. Wabash Ave., Chicago, Ill..... 48
Terry Mfg. Co., Grand Central Terminal, New York, N. Y..... 389
*Terry Steam Turbine Co., Hartford, Conn. 26, 27
Textile Machine Works, Reading, Pa..... 644
Tide Water Oil Co., 11 Broadway, New York, N. Y.....252, 253
*Timken Roller Bearing Co., Canton, Ohio.....352, 353
*Titusville Iron Works Co., Titusville, Pa.... 89
Toledo Crane Co., 102 Sandusky St., Bucyrus, Ohio..... 399
Tolhurst Machine Works, Troy, N. Y..... 616
Torrington Mfg. Co., Torrington, Conn..... 641
Transue & Williams Steel Forging Corp'n, Alliance, Ohio..... 432
*Troy Engine & Machine Co., Troy, Pa..... 14

U

*Uehling Instrument Co., 2011 Empire Bldg., New York, N. Y..... 286
Under-Feed Stoker Co. of America, Book Bldg., Detroit, Mich..... 120
*Union Drawn Steel Co., Beaver Falls, Pa.... 423
Union Engineering Co., Cleveland, Ohio.... 645
*Union Iron Works, Erie, Pa..... 90
*Union Steam Pump Co., Battle Creek, Mich. 582
Union Water Meter Co., Worcester, Mass... 276
*U. S. Ball Bearing Mfg. Co., Palmer St. & Kolmar Ave., Chicago, Ill..... 355
*U. S. Cast Iron Pipe & Foundry Co., Burlington, N. J.....232, 233
United States Gauge Co., 44 Beaver St., New York, N. Y..... 290
*United States Metallic Packing Co., 429 N. 13th St., Philadelphia, Pa..... 257

V

Valley Iron Works Co., Appleton, Wis..... 647
Velco Mfg. Co. (Inc.), Greenfield, Mass..... 461
Victor Saw Works (Inc.), Springfield, Mass. 509
*Vilter Mfg. Co., 1194–1196 Clinton St., Milwaukee, Wis.....16, 17
*Vogt, Henry Machine Co., Louisville, Ky.....632, 633
Vulcan Steam Forging Co., 247 Rano St., Buffalo, N. Y..... 433

W

Wachs, E. H. Co., 1525 Dayton St., Chicago, Ill..... 15
*Walsh & Weidner Boiler Co., Chattanooga, Tenn..... 91
*Ward, Charles Engineering Works, Charleston, W. Va..... 92

Digitized by Google

ALPHABETICAL LIST OF FIRMS CATALOGUED

PAGE

*Warner & Swasey Co., Cleveland, Ohio..456, 457
Warren Steam Pump Co., Warren, Mass.... 583
*Washburn & Granger (Inc.), 50 Church St., New York, N. Y..... 127
Watertown Engine & Machine Co., Watertown, N. Y..... 51
Watson-Stillman Co., 35 Church St., New York, N. Y..... 596
Webster, Warren & Co., Camden, N. J...154, 155
Weller Mfg. Co., 1820-1856 N. Kostner Ave., Chicago, Ill..... 381
Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa.....160, 161
Westinghouse Traction Brake Co., Wilmerding, Pa.....550, 551
*Wheeler, C. H. Mfg. Co., Sedgley & Lehigh Ave., Philadelphia, Pa..... 163
*Wheeler Condenser & Engrg. Co., Carteret, N. J..... 162
White, S. S. Dental Mfg. Co., 84 Market St., New York, N. Y..... 359
*Whitney Mfg. Co., Hartford, Conn..... 495
*Wickes Boiler Co., Saginaw, Mich..... 93
Wilbraham-Green Blower Co., Pottstown, Pa..... 559
Willcox Engineering Co., Saginaw, Mich.272, 613

PAGE

Williams, J. H. & Co., 70 Richards St., Brooklyn, N. Y..... 517
Williams Patent Crusher & Pulverizer Co., St. Louis, Mo.....602, 603
Wilmarth & Morman Co., Grand Rapids, Mich..... 490
Wilson Welder & Metals Co. (Inc.), 253 36th St., Brooklyn, N. Y..... 537
Wing, L. J. Mfg. Co., 352 W. 13th St., New York, N. Y.....107, 625
Wood, R. D. & Co., Philadelphia, Pa..... 597
Wood Turret Machine Co., Brazil, Ind. .458, 459
*Wood's, T. B. Sons Co., Chambersburg, Pa. 334, 335
*Worthington Pump & Mchy. Corp'n, 115 Broadway, New York, N. Y.....44, 45, 46, 47

Y

*Yale & Towne Mfg. Co., Stamford, Conn... 405
*Yarnall-Waring Co., 7603-20 Queen St., Chestnut Hill, Philadelphia, Pa..... 196
Yeomans Bros. Co., 1426 Dayton St., Chicago, Ill..... 584
York Mfg. Co., York, Pa..... 631

Digitized by Google

Digitized by Google

Power Plant Equipment

EQUIPMENT CATALOGUED IN THIS DIVISION

Data begins on page number given as closely as can be divided. Consult Directory Section (green pages) for specific products.

	PAGE		PAGE
Arches, Boiler	133	Grates	123
Baffle Walls	109	Heaters, Feed Water	146
Balanced Draft Systems	108	Hose	259
Blowers, Forced Draft	105	Injectors	217
Blowers, Soot	110	Insulating Materials, Heat	135
Boiler Fittings	101	Lubricants	251
Boiler Washer Systems (Locomotive)	145	Lubricators	248
Boilers, Steam	52	Motors, Electric	18
Burners, Oil	130	Oiling Systems	248
Chimneys	95	Packings	254
Coal Agitators	132	Pipe and Fittings	228
Condensation Return Systems	243	Piping, Power	234
Condensers	158	Piston Rings	246
Controllers, Temperature	222	Pulverized Coal Equipment	128
Cooling Towers	156	Refractory Materials	133
Coverings, Pipe	244	Regulators, Damper	206
Economizers, Fuel	96	Regulators, Feed Water	103
Ejectors	217	Regulators, Pressure	205
Engine Repairs	51	Regulators, Tank	219
Engines, Diesel	36	Separators, Oil	150
Engines, Gas	49	Separators, Steam	146
Engines, Oil	36	Spray Cooling Systems	164
Engines, Steam	4	Stokers	111
Filters, Oil	153	Superheaters, Steam	98
Gas Producer Plants	94	Traps, Steam	200
Gaskets	256	Turbines, Hydraulic	18
Generating Sets	19	Turbines, Steam	18
Generators, Electric	18	Valve Control	197
Governors, Engine	247	Valve Reseating Machines	198
Governors, Pump	205	Valves and Fittings	168
		Water Purifiers	140

See next page for list of firms catalogued

CATALOGUE SECTION

PART I **Pages 1-262**

Digitized by Google

INDEX TO FIRMS CATALOGUED IN PART I

A

PAGE

Allis-Chalmers Mfg. Co. 28, 29
American Chimney Corp'n. 95
American District Steam Co. 242
American Engineering Co. 111
American Injector Co. 217
American Metal Hose Co. 262
American Metallic Packing Co. 254
American Steam Gauge & Valve Mfg. Co. . 200, 201
Ames Iron Works. 4
Automatic Furnace Co. 112, 113

B

Babcock & Wilcox Co. 52, 53, 54, 55
Badenhausen, Phillips. 56
Badger, E. B. & Sons Co. 164
Barco Mfg. Co. 240
Bass Foundry & Machine Co. 57
Bayer Steam Soot Blower Co. 110
Bernitz Furnace Appliance Co. 133
Best, W. N. Furnace & Burner Corp'n. 130
Bigelow Co. 58
Braun, C. F. & Co. 156, 157
Brownell Co. 59
Buckeye Iron & Brass Works. 168
Budd Grate Co. 123
Busch-Sulzer Bros.-Diesel Engine Co. 36

C

Casey-Hedges Co. 60, 61
Cash, A. W. Co. 205
Celite Products Co. 135
Central Foundry Co. 228
Clow, James B. and Sons. 230, 231
Coatesville Boiler Works. 62
Cole, R. D. Mfg. Co. 63
Cook's, Adam Sons. 251
Cooling Tower Co. (Inc.) 165
Coppus Engineering and Equipment Co. . 104, 105
Cramp, Wm. & Sons Ship & Engine Building Co. 30, 31
Crane Co. 170, 171, 172, 173
Crescent Refractories Co. 136
Crosby Steam Gage & Valve Co. 202

D

Dean, Payne (Ltd.) 197
Delany, P. & Co. 64
De Laval Steam Turbine Co. 22
De La Vergne Machine Co. 40
D'Este, Julian Co. 206, 207
Detroit Stoker Co. 114, 115
Dodge Sales & Engineering Co. 42, 43
Dole Valve Co. 226
Dougherty, M. J. Co. 234
Drake Non-Clinkering Furnace Block Co. . . 134
Dunham, C. A. Co. 227

E

Eckenroth Valve & Mfg. Co. 169
Edge Moor Iron Co. 65
Ellis, W. E. Co. 132
Engberg's Electric & Mechanical Works. . . . 6, 7
Engineer Co 108, 109

PAGE

Erie Ball Engine Co. 5
Erie City Iron Works. 66, 67
Erie Engine Works. 8
Ever-Tyte Piston Ring Division. 246

F

Fairbanks Co. 174, 175
Fairbanks, Morse & Co. 41
Files Engineering Co. (Inc.) 122
Fisher Governor Co. 208
Flynn & Emrich Co. 121
Ford Regulator Corp'n. 176
Foster Engineering Co. 209
France Packing Co. 255
Franklin Machine Co. 9
Frederick Engineering Co. 116
Frost Manufacturing Co. 68
Fuller-Lehigh Co. 128
Fulton Co. 218, 219
Fulton Iron Works Co. 37

G

General Electric Co. 18, 19, 20, 21
Glasgow Iron Co. 99
Goetze Gasket and Packing Co. 256
Goodrich, B. F. Rubber Co. 258, 259
Green Fuel Economizer Co. 96, 97
Greene, Tweed & Co. 250

H

H. S. B. W.-Cochrane Corp'n. 146, 147
Heine Boiler Co. 70, 71
Hobson, Russell B. 243
Homestead Valve Mfg. Co. 177
Hooven, Owens, Rentschler Co. 10
Hope Engineering & Supply Co. 49
Hulson Grate Co. 124, 125

I

Illinois Engineering Co. 210, 211
Illinois Malleable Iron Co. 241
Illinois Stoker Co. 117
International Eng. Works (Inc.) 72, 73

J

Jarecki Manufacturing Co. 178, 179
Jenkins Bros. 180, 181
Johns-Manville (Inc.) 244
Johnson Service Co. 220, 221
Jolly, J. & W. (Inc.) 32

K

Keeler, E. Co. 69
Kelly & Jones Co. 182, 183
Kerr Turbine Co. 23
Key Boiler Equipment Co. 100, 101
Kidwell Boiler & Engineering Co. 74
Kieley and Mueller (Inc.) 212
King Refractories Co. (Inc.) 137
Krause, Arthur E. 153
Kroeschell Bros. Co. 75

Digitized by Google

INDEX TO FIRMS CATALOGUED IN PART I

L

PAGE

Ladd, George T. Co. 76, 77
Leavitt Machine Co. 198, 199
Lebanon Boiler Works 78, 79
Leffel, James & Co. 33
Leslie Co. 213
Lockett, A. M. & Co. (Ltd.) 131
Lonergan, J. E. Co. 203
Loomis-Manning Filter Distributing Co. . . 140
Lunkenheimer Co. . . . 184, 185, 186, 187, 188, 189
Lynchburg Foundry Co. 229

M

McClave-Brooks Co. 126
McIntosh & Seymour Corp'n 38
Magnesia Association of America 245
Malleable Iron Fittings Co. 236
Manistee Iron Works Co. 158
Mason Regulator Co. 214, 215
Milwaukee Reliance Boiler Works 148
Moore Steam Turbine Corp'n 24, 25
Murphy Iron Works 118
Murray Iron Works Co. 80, 81

N

Nason Manufacturing Co. 216
National Boiler Washing Co. 145
National Pipe Bending Co. 150, 151
Nelson Valve Co. 190
New London Ship & Engine Co. 39
New York Engineering Co. 82
New York Rubber Co. 260, 261
Nordberg Mfg. Co. 11
Northern Equipment Co. 102

O

O'Brien, John Boiler Works Co. 83
Oil City Boiler Works 84
Olmstead, A. E. & Sons 50
Open Coil Heater and Purifier Co. 149

P

Page Boiler Co. 85
Pelton Water Wheel Co. 34, 35
Permutit Co. 141
Pickering Governor Co. 247
Pierce, Butler & Pierce Mfg. Corp'n. 204
Pittsburgh Valve, Foundry & Construction Co. 192, 193
Powers Regulator Co. 222, 223
Providence Engineering Corp'n 12

Q

Quigley Furnace Specialties Co. 129, 138, 139

R

Reading Valve and Fittings Co. 194, 195, 238, 239
Refinite Co. 142
Richardson-Phenix Co. 248, 249
Riley, Sanford Stoker Co. 119

S

S-C Regulator Mfg. Co. 103
Sarco Co. (Inc.) 224, 225
Scaife, Wm. B. & Sons Co. 143
Schutte & Koerting Co. 159
Scott Valve Mfg. Co. 191
Simmons Pipe Bending Works 235
Sims Co. 152
Skinner Engine Co. 13
Smith Gas Engineering Co. 94
Smith, Samuel & Son Co. 88
Spray Engineering Co. 166, 167
Springfield Boiler Co. 86, 87
Standard Water Systems Co. 144
Stockham Pipe & Fittings Co. 237
Sturtevant, B. F. Co. 106
Superheater Co. 98

T

Taylor Machine Co. 48
Terry Steam Turbine Co. 26, 27
Tide Water Oil Co. 252, 253
Titusville Iron Works Co. 89
Troy Engine & Machine Co. 14

U

Under-Feed Stoker Co. of America 120
Union Iron Works 90
United States Cast Iron Pipe & Foundry Co. 232, 233
United States Metallic Packing Co. 257

V

Vilter Manufacturing Co. 16, 17

W

Wachs, E. H. Co. 15
Walsh & Weidner Boiler Co. 91
Ward, Charles Engineering Works 92
Washburn & Granger (Inc.) 127
Watertown Engine & Machine Co. 51
Webster, Warren & Co. 154, 155
Westinghouse Electric & Mfg. Co. 160, 161
Wheeler, C. H. Manufacturing Co. 163
Wheeler Condenser & Engineering Co. 162
Wickes Boiler Co. 93
Wing Mfg. Co. 107
Worthington Pump & Machinery Corp'n 44, 45, 46, 47

Y

Yarnall-Waring Co. 196

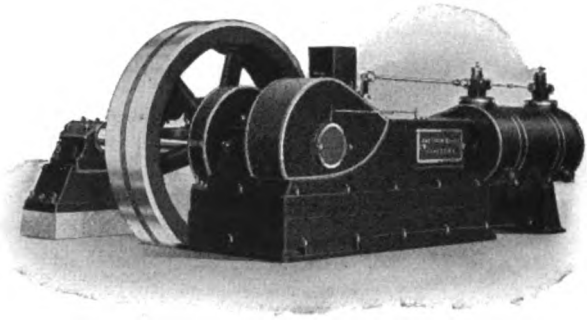
Digitized by Google

AMES IRON WORKS

OSWEGO, N. Y.

Branches in All Principal Cities

Manufacturers of Highest Grade Engines and Boilers



Ames Una-Flow Engine

AMES UNA-FLOW ENGINES:

Are built of both Fixed and Controlled Compression types in sizes from 50 H. P. to 1200 H. P.

The Fixed Compression type is a two-poppet valve engine of exceptional simplicity and secures the utmost in fuel economy. This type operates equally well either non-condensing or condensing and under usual variations of operating conditions.

This Ames Engine has fairly earned its established reputation for economy, efficiency and dependability and our extensive experience in the building of Una-flow Engines has enabled us to embody numerous modifications and refinements of real merit and value to our customers.

The Controlled Compression type is a four-poppet valve engine, so designed that with slight adjustment it will perform properly and economically under a wide range of operating conditions. This engine was developed to satisfactorily meet numerous demands for a Una-flow Engine to operate under unusual variations in admission pressures and back-pressures.

Both above type engines, having non-confined poppet valves throughout, are ideal engines for high steam pressures and superheated steam.

REFRIGERATING UNIT ENGINES:

Ames Una-flow Engines are also built of the constant and variable speed types for direct shaft connection to ammonia compressors.

PUMPING ENGINES:

Ames Una-flow Engines are also built for direct connection to centrifugal pumps, blowers and other equipment.

HEAVY DUTY SINGLE VALVE ENGINES:

These are of the well known Ames Side and Center Crank types. They are designed for modeate and high speeds, in sizes from 25 to 500 H. P. These slide valve engines are simple in construction and reliable for continuous heavy duty service.

BOILERS:

Ames boilers include the following fire tube types: Horizontal Return Tubular, Upright, Return Tubular Portable, Locomotive, Portables on wheels and skids.

They are constructed for all commercial pressures and to meet all requirements and boiler codes.

Ames boilers are built in usual sizes from 10 H. P. to 200 H. P., depending upon their type and construction.

SMOKESTACKS, BREECHINGS, TANKS, Etc.:

The above and special plate and sheet metal work built to meet all specifications and requirements.

Bulletins descriptive of Engines and Boilers furnished upon request. Please specify type and requirements.

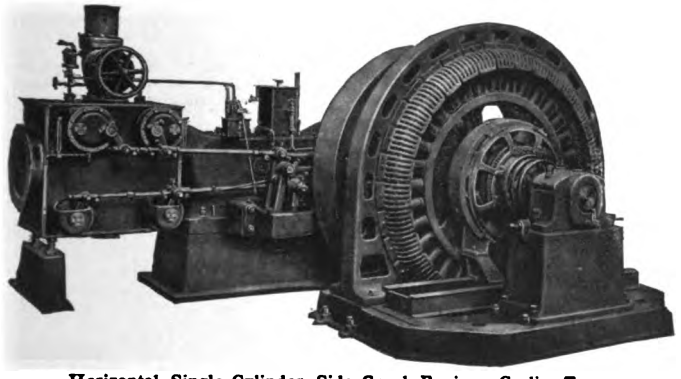
The Ames Iron Works aims to sell experience and service with their product.

Digitized by Google

ERIE BALL ENGINE CO.

PITTSBURGH, PA.

Builders of Horizontal, Single-Cylinder and Cross-Compound Single-Valve and Corliss Engines



Horizontal, Single-Cylinder, Side-Crank Engine—Corliss Type

BALL HIGH-SPEED CORLISS ENGINES:

The feature which distinguishes this engine from other four-valve shaft-governed engines is the patented non-detaching valve gear, which imparts the same movement to the valves that the drop cut-off of the slow-speed Corliss produces by picking up and dropping them. This permits the use of the best form of valve, and the valves are given the movement necessary for the greatest durability and tightness.

Built in sizes from 100 H. P. to 1600 H. P. in the single-cylinder and cross-compound types.

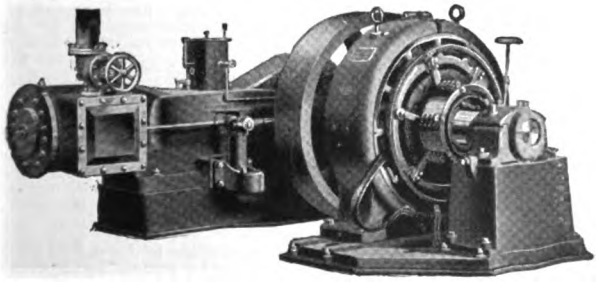
These engines excel in economy and regulation and are especially adapted for driving generators.

BALL SINGLE-VALVE AUTOMATIC ENGINES:

These engines are the result of a long experience in building engines for electric service. They are superior in design and construction. The regulation and economy are the best of their type.

Built in sizes from 25 H. P. to 800 H. P. in the single-cylinder and cross-compound types.

SEE OURAWEEK'S MECHANICAL ENGINEERING



Single-Cylinder, Side-Crank Engine—Single-Valve Type

Digitized by Google

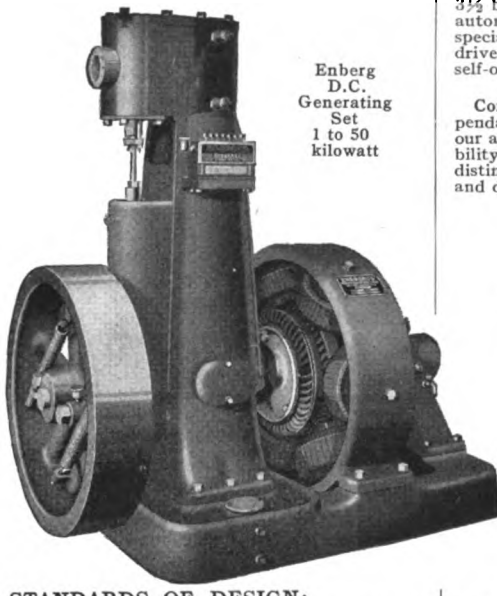
ENGBERG'S ELECTRIC & MECHANICAL WORKS

No. 18 VINE ST., ST. JOSEPH, MICHIGAN, U. S. A.

Manufacturers of Dynamos and Engines

PRODUCTS:

Engberg Engines, Generators and Direct Connected Generating Sets and Direct Current Motors.



Enberg D.C. Generating Set 1 to 50 kilowatt

STANDARDS OF DESIGN:

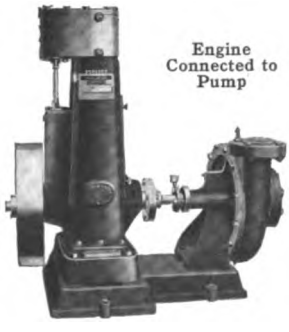
The design of Engberg engines and generators is the result of 20 years' experience in perfecting and producing the most reliable, and at the same time, the most efficient, generating sets obtainable.

For dependability, economy in steam and oil, and low cost of maintenance, Engberg direct current generating sets are a most remarkable piece of equipment.

The workmanship and materials can not be excelled. We invite careful inspection and investigation because the general principles, as well as the smallest details, have never failed to attract the attention of the most critical buyer.

ENGINES:

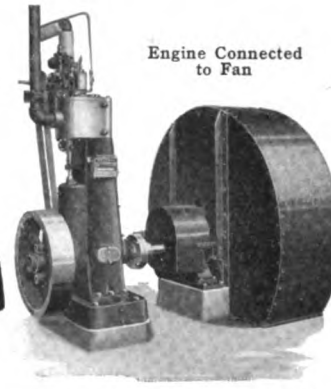
Guarantee—Engberg engines are guaranteed to be free from defective workmanship, material and design, and to do the work they are intended for. We will repair or replace without cost to the purchaser, any part or parts of engines which shall prove defective within one year from date of shipment, while operating under normal conditions and under proper supervision and attendance.



Engine Connected to Pump

Range—The engines are manufactured from 3½ by 3½ in. to 12 by 10 in., with either the automatic or throttle governor, and on request, specially equipped for direct connection or belt drive, and for all lines of service where a vertical self-oiling automatic engine is adaptable.

Construction—Simplicity combined with dependability and successful performance has been our aim in producing Engberg engines. Accessibility and ease of adjusting all working parts are distinctive. The principal features in construction and design follow.



Engine Connected to Fan

Connecting Rod—This is undoubtedly the heaviest and most substantial rod used on this type of engine. It is made of special connecting rod steel and on all engines up to and including frame D, the rod is drop forged, while on the larger sizes of cast steel.

Crosshead—Every precaution has been exercised to make this, the most vital part of the engine, exceptionally strong, and most suitable for dependable and continuous performance.

Valve—The valve is of the balanced piston type of close grained iron and is ground to a perfect fit in the valve chamber. It is accurately fitted to the valve rod, and is secured by a nut and lock nut. The lower end of the valve rod is threaded and screws into the valve slide and is secured by the use of a lock nut. By merely loosening on the lock nut, the valve can be easily adjusted or set.

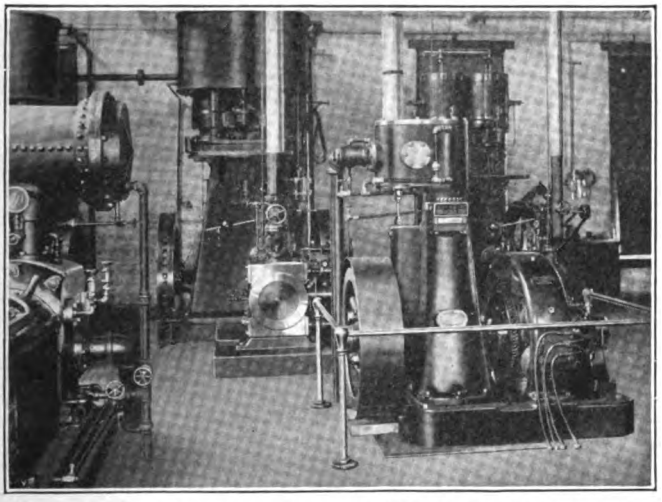
Lubrication—On all engines larger than frame A, the lubricating system is made up with oil pump in base of engine, pumping oil from oil reservoir in base of engine up into distributing oil trough on side of engine frame. This trough is provided with adjustable sight feeds to each bearing. Then oil is redrained back into base, refiltered and repumped.

In addition to direct feed to each bearing, the supply pipe leading to crosshead slides, etc., is so liberal as to cause constant dripping on to counterbalances, causing all reciprocating parts to operate in a constant spray.

Digitized by Google

ENGBERG'S ELECTRIC & MECHANICAL WORKS
ST. JOSEPH, MICH.

DYNAMOS:

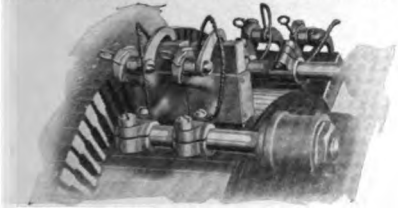


Guarantee—Their rating, stability and performance are guaranteed and we will, without cost to the purchaser, within one year from shipment, repair, or at his option furnish another part, f.o.b. our works, in exchange for any part or parts of machine that shall, under normal conditions of operation and under proper supervision and attendance, prove defective.

Impregnated Windings—The shunt and series coils of the Engberg generator are impregnated under vacuum process with a waterproof compound, after which they are subjected to a thorough baking process.

The armature coils are saturated with an insulating waterproof varnish and carefully baked. All windings are taped and protected to insure satisfaction, even when subjected to unusually rough usage.

Armature—Of the iron clad ventilated type, with laminated core, built of electrical sheet steel, thoroughly japanned before assembling. Drum and core are provided with air ducts, permitting thorough circulation of air. Nothing but best double cotton covered magnet wire of highest conductivity is used, and the insulation is waterproof.



Brush Holder Rigging

Commutator—Made of copper bars, insulated with best grade mica plate, and is very heavy, insuring years of continuous operation without renewal. Built upon separate sleeve and bolted to armature drum, so the shaft can be removed, without disturbing the windings.

Brush Holder Rigging—The brush holder yoke is a heavy iron casting, attached to end bearing, and is of ample strength to insure firm support for the brushes. The brush holders are of the reacting type, and of most modern design. The best grade of carbon brushes for the purpose are used.

ADAPTABILITY OF ENGBERG GENERATING SETS:

Direct current, direct connected generating sets can be furnished from 1 to 50 kw.

Alternating current, direct connected generating sets are built from 20 to 75 kv.a., in any standard phase, voltage and cycles.

Engberg direct connected generating sets are operating all lines of industry where quality and dependable performances are the first consideration.

For marine lighting sets, they are unexcelled, because very compact, requiring little floor space, and will operate continuously with practically no attention.

Practically all builders of dredges, steam shovels and magnet cranes, as well as the leading contractors, railroad and steel corporations, have adopted the Engberg set as standard.

They are used extensively for lighting and power service in factories, hotels and office buildings.

Weights and dimensions of generating sets

Engine Frame	K. W	No. of Poles	Size of Engine	Steam Pressure	Rev. Per Minute	Diameter Pipes		Weight		Code Word 110–125 Volts	Code Word 220–230 Volts
						Steam	Exhaust	Net	Crated		
A	1	4	3½x3½	90	750	1	1¼	550	600	Bacaad	Olgaad
A	1½	4	3½x3½	90	750	1	1¼	575	625	Edcaad	Rogaad
A	2½	4	3½x3½	90	750	1	1¼	625	690	Fecaad	Spgaad
B	3½	4	4½x4	90	500	1¼	1½	995	1065	Ihcaad	Urgaad
B	5	4	4½x4	90	700	1¼	1½	985	1040	Jicaad	Wtgaad
C	6	4	6x5	90	400	1½	2	1825	1925	Lkcaad	Xugaad
C	7½	4	6x5	90	500	1½	2	1845	1950	Oucaad	Yvgaad
D	8	6	6x6	90	375	2	2½	2860	2985	Pacaad	Azgaad
D	10	6	6x6	90	450	2	2½	2900	3025	Srcaad	Bygaad
D	10	6	7x6	90	350	2	2½	3000	3125	Tscaad	Fzkaad
D	12½	6	7x6	90	425	2	2½	3050	3175	Utcaad	Hckaad
F	15	6	7x7	90	400	2½	3	4840	5040	Vucaad	Idkaad
F	17½	6	8x7	90	400	2½	3	4850	5050	Yxcaad	Jekaad
G	20	6	8x8	90	325	3	3½	5400	5600	Azcaad	Lpkaad
G	25	6	8x8	90	400	3	3½	5450	5650	Dagaad	Nikaad
I	25	8	9x9	90	325	3	3½	6800	7000	Ebgaad	Ojkaad
I	30	8	10x9	90	300	3	3½	7000	7200	Higaad	Sukaad
J	40	8	10x10	90	300	3	3½	9650	9950	Ifgaad	Upkaad
J	50	8	12x10	90	275	3	3½	10750	11050	Ligaad	Ytpaad

Digitized by Google

ERIE ENGINE WORKS

ERIE, PA.

Manufacturers of "Victor" Steam Engines

SPECIAL SALES REPRESENTATIVES

NEW YORK CITY
W. B. Connor, Inc.—90 West Street
BOSTON, MASSACHUSETTS
Schumaker-Santry Co.—141 Milk Street
CLEVELAND, OHIO
Dravo-Doyle Co.—Leader News Building

CHICAGO, ILL.
Maher Engineering Co.—30 N. Michigan Boulevard
PITTSBURGH, PA.
Dravo-Doyle Co.—Diamond Bank Building
PHILADELPHIA, PA.
Dravo-Doyle Co.—Commercial Trust Building
Dravo-Doyle Co.—Merchants Bank Building, INDIANAPOLIS, INDIANA

VICTOR VERTICAL STEAM ENGINES:

These engines are adapted, as will be appreciated, to furnish power for all requirements where this style engine is applicable, whether direct connected or belted, and with either automatic or throttling governor.

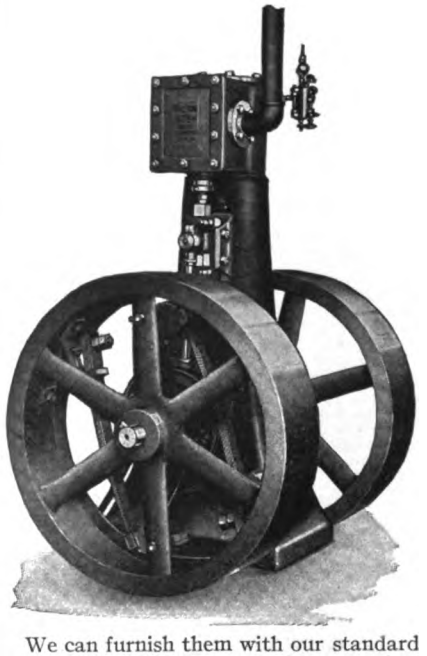
The fact that these engines have been approved and adopted by large manufacturers of generators, blowers, pumps, stokers, etc., is evidence that they are all that could be required for continuous, satisfactory service.

These are the heavy duty, fully enclosed type, and have complete automatic lubrication throughout. Specifications and full description are contained in our special bulletin issued which we solicit an opportunity to furnish.

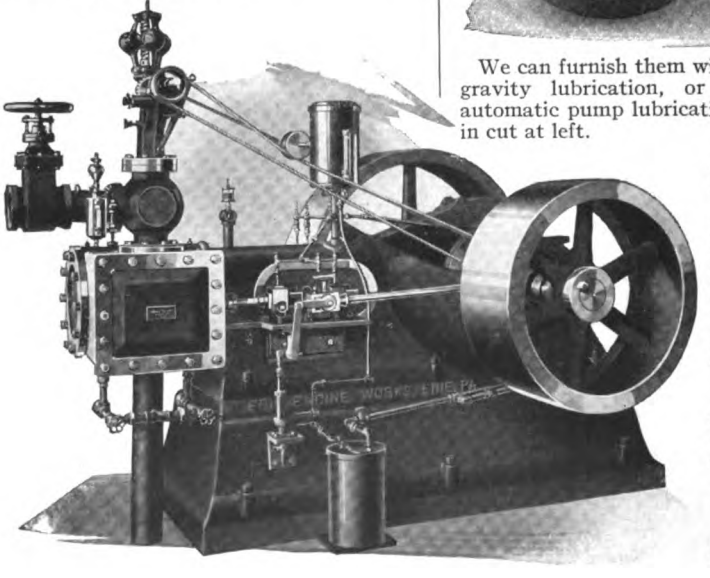
8

VICTOR HORIZ. STEAM ENGINES:

This line of heavy duty, high speed, enclosed, automatic and throttling Victor horizontal engines we are prepared to furnish in sizes from 6 to 350 H. P. Full specifications and description in detail are supplied in our bulletins.



We can furnish them with our standard gravity lubrication, or with complete automatic pump lubrication as illustrated in cut at left.



For requirements within this range of sizes we can make most attractive offerings as our product is produced under the most favorable conditions.

Quotations and complete bulletins on application.

STEAM ENGINE BUILDERS FOR 40 YEARS

Digitized by Google

FRANKLIN MACHINE COMPANY

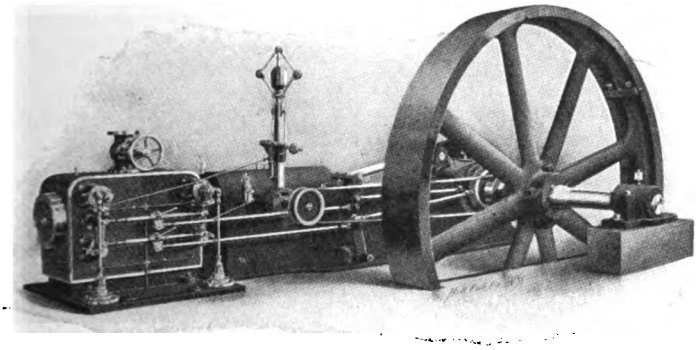
Engineers, Founders and Machinists

P. O. ADDRESS BOX 1393, PROVIDENCE, R. I.

FRANKLIN PLANT AND FOUNDRY
189 Charles St.

HARRIS-CORLISS PLANT
Park and Promenade St.

Manufacturers of Steam Engines, Transmission Machinery, Special Textile Machinery, Spun Silk Machinery, Machines for Steel, Rubber and Paper Mills, Gray Iron Castings, All Kinds of General Repairs and Mill Work



Valve Gear Side Simple Harris-Corliss Engine, Extra Heavy Duty Type

IMPROVED HARRIS-CORLISS ENGINES with Brown Patented Valve Releasing Gear.

The durability and economy of Harris-Corliss Engines are phenomenal.

Built in all sizes from 50 to 2500 H. P.

REBUILDING AND REPAIRING ENGINES.

Break-Down Jobs Given Special Attention.

Mill Repairs, Shafting and Machine Work.

WOOD RIM PULLEYS

Special Machinery Built to Order.

A Partial List of Our Products:

Agitators
Ball Winding Machines
Silk Beaters
Silk Lapping Machines
Silk Circular Dressing Machines
Silk Filling Engines
Silk Waste Openers
Silk Softening Machines
Silk Stretchers
French Worsted Drawing Frames (Frotteurs)
Automatic Power Shoe Lace Tipping Machines
Shoe Lace Tip Cutting-Off Machines
Ball Bearing Shoe Cars
Ball Bearing Turntables
Shoe Pins
Shoe Sticks
Shoe Stands
Yarn Dressers (Brush Type)
Take Up for Yarn Dressers
Cotton Bat Heads
Wool Top Baling Presses
Yarn Baling Presses
Harris-Corliss Steam Engine
Brown Valve Gears
Pulleys Hangers
Shafting Couplings Bearings

Digitized by Google

The HOOVEN, OWENS, RENTSCHLER Co.

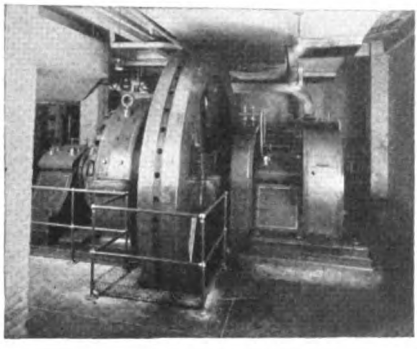
HAMILTON, OHIO

Designers and Builders of Hamilton Corliss, Slow and Medium Speed Engines; Poppet Valve and Uniflow Medium and High Speed Engines; Blowing Engines; Compressors; Gas and Gas-Steam Engines. Designers and Makers of Sugar Mill Crushing Machinery and Engines. All Kinds of Heavy Iron or Semi-steel Castings Made and Machined

HAMILTON CORLISS ENGINES:

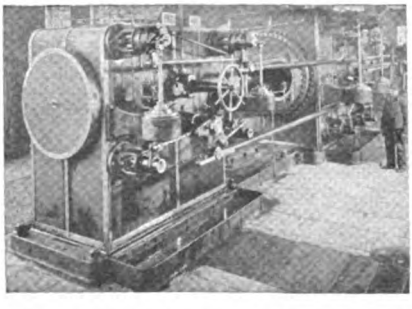
Nearly five thousand Hamilton Corliss engines are supplying power in hundreds of industries. The first engine, built in 1882, is still in perfect running order.

Simple, Cross-compound, Tandem—any design and size built for any kind of work. Particularly suited for exceptionally heavy work or where conditions demand absolute reliability of operation.



Hamilton Corliss 24″ x 42″ Heavy Duty Simple Engine. In Pennsylvania Hotel, New York—the Largest Hotel in the World

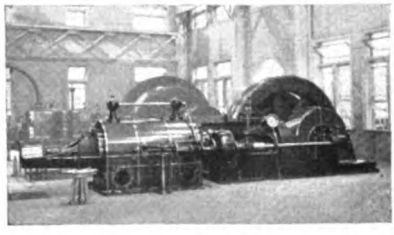
The Hamilton Corliss valve gear has been improved—chiefly refinements permitting better lubrication—and we believe that in its present form it represents the highest type for this class of engines.



Hamilton Corliss Rolling Mill Engine at Carnegie Steel Co., Clairton, Pa.

HAMILTON POPPET VALVE AND UNIFLOW ENGINES:

Hamilton Poppet Valve and Poppet Valve Uniflow Engines for medium-to-high speeds are designed to be used with high steam pressures and high temperature steam. These embody the most modern developments in steam engine design and consequently are highly efficient in operation.



Hamilton-Uniflow Engine

HAMILTON FACILITIES:

In addition to products enumerated, we build blowing engines for blast furnaces, gas engines and gas-steam engines. We built the 60,000 h. p. power plant of Henry Ford at Detroit.

Municipal power and light or pumping installations—anything in steam engine power producers is our chosen field.

We make and machine heavy castings of all descriptions—rolling mill equipment, sugar mills and engines, marine engines, plate glass tables; cylinders on new or repair jobs, or any other large units.

Our engineering department is ready to answer any questions or help to solve any problem in steam engineering. **Write.**

SEE OUR ADVTS. IN MECHANICAL ENGINEERING THE JOURNAL OF THE A.S.M.E.

Digitized by Google

NORDBERG MFG. CO.

MILWAUKEE, WIS.

Engineers and Designers of High Efficiency Nordberg-Todd Uniflow Poppet Valve Engines, Corliss Engines, High Compression Oil Engines, Nordberg-Carels Diesel Type Engines, Air Compressors, Blowing Engines and Steam, Air and Electric Mine Hoists, Condensers, and Special Machinery

UNIFLOW POPPET VALVE ENGINES:

Nordberg-Todd Uniflow Poppet Valve Engines will carry a widely fluctuating load with lower average steam consumption than any other type of steam prime mover. They can be operated condensing or non-condensing, with high back pressure or vacuum and with any degree of superheat and steam pressure. The sizes range from 200 to 2000 H. P.

CORLISS ENGINES:

Nordberg Corliss Engines are made in all sizes with both standard and long range valve gear. They are known the world over for their reliability and high efficiency.

NORDBERG-CARELS OIL ENGINES:

These engines are made for either constant or variable speed operation. They are particularly well adapted for operation at high elevations and for continuous non-stop service. As an economical producer of compressed air, the oil engine-driven compressor stands without a peer. Nordberg-Carels Diesel Oil Engines are made in sizes from 200 to 3000 B.H.P., are suitable for heavy duty work, and are exceptionally economical in fuel consumption. A large variety of fuels may be used.

HIGH COMPRESSION OIL ENGINES:

The Nordberg two-cycle oil engine is the simplest on the market. It has no valve gears or valves subjected to working pressure and heat. Sizes range from 50 to 200 B.H.P.

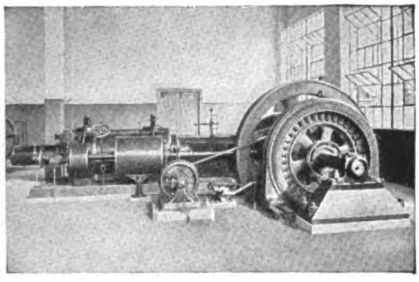
ELECTRIC HOISTS:

Many of the notable coal and metal mine hoists have been made by Nordberg. They are especially known for their safety features, speed, and size. In all the famous mines where electric hoists are used, Nordberg Hoists predominate.

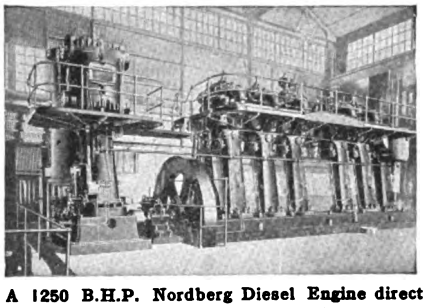
STEAM AND AIR HOISTS:

Nordberg Steam Hoists are well known to all mining men. All of the successful compound condensing and all the air Hoists are of Nordberg make.

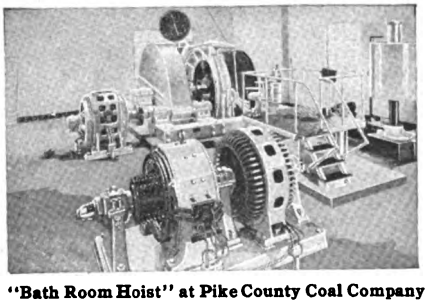
Bulletins on any of the above apparatus sent on request.



A 15"x24" Nordberg-Todd Uniflow Poppet Valve Engine driving an A. C. Generator with belted exciter in an eastern chemical plant



A 1250 B.H.P. Nordberg Diesel Engine direct connected to a 6400 cu. ft. Nordberg Compressor. Three more 1250 B.H.P. Nordberg Diesel Engines are direct connected to A. C. Generators located in the same plant



"Bath Room Hoist" at Pike County Coal Company Petersburg, Indiana. A typical electric coal mine hoist. Present output 2000 tons per 8 hours. Future output to be increased to 5000 tons

Digitized by Google

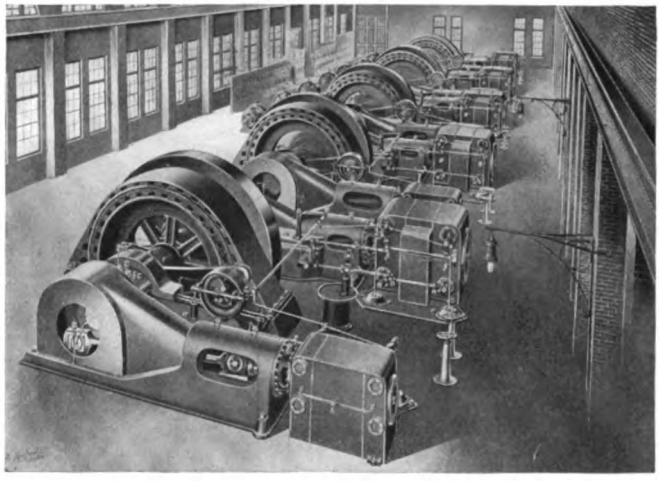
Steam Engines, General Machine Work

PROVIDENCE ENGINEERING CORP'N

PROVIDENCE, R. I., U. S. A.

NEW YORK OFFICE: 5 NASSAU ST.

Builders of Stationary and Marine Engines



Five 1000 K. W. Rice and Sargent Corliss Engines

RICE & SARGENT CORLISS ENGINES:

Sizes: Simple engines 150 H. P. and up. Compound 300 to 10,000 H. P.

Speeds: 150 R. P. M. and higher up to 1000 H. P. Proportional speeds on larger sizes.

Valve Gear: Patented releasing gear without wrist plates, hook rods, spring latches, etc. Double and triple ported valves. Long range cut-off (80%) vacuum and spring dashpots.

Frame: Heavy duty or rolling mill type, cast in one piece.

Governor: Patented Sargent, with closest possible (1%) regulation.

Safety: Our own built-in safety stop entirely separate from the governor.

Friction: Not over 3%.

Economy: Unequaled.

There has never been a flywheel accident on a Rice & Sargent engine.

MARINE ENGINES, Surface Condensers and Equipment.

GENERAL MACHINE AND DEVELOPMENT WORK: Large, well-equipped shops and competent engineering staff available at all times for production work on general machinery and parts to plans and specifications.

Quantity production to close limits a specialty.

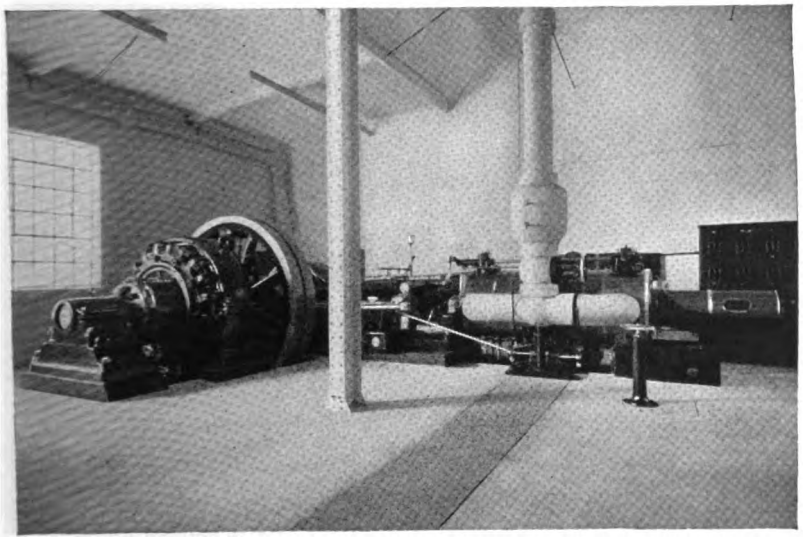
Digitized by Google

SKINNER ENGINE COMPANY

ERIE, PA., U. S. A.

Branches in all Large Cities

Builders of High-Economy Steam Engines



A 500-kw. Installation

THE "UNIVERSAL UNAFLOW:"

"The Most Economical Steam Engine Ever Built"

To prove this statement, many contracts have been made where the "Universal Unaflow" has been made to pay its additional cost in the saving effected against compound engines, Corliss engines, steam turbines, other makes of unaflow engines and central station rates.

These engines are designed to give the maximum economy obtainable with high or low pressure, condensing or noncondensing, and with or without superheat. They are built in side and center crank types and in capacities from 50 to 1500 horsepower.

Its Expansion Compensating Poppet Valves insure the original economy being indefinitely maintained.

The engine automatically changes its functions to operate both condensing and noncondensing without manual adjustment, with small clearances and consequently best economy.

Over forty patents, owned by us, prevent the use of our exclusive features by others.

Literature on request.

Digitized by Google

TROY ENGINE & MACHINE CO.

TROY, PENNSYLVANIA

Manufacturers of Center-Crank Steam Engines

TROY

TROY ENGINES:

Back of the Troy engine stand 30 years of specialized effort to produce the best engine selected materials, skilled workmen and engineering experts are capable of. We are therefore justly proud of the world-wide reputation for excellent efficient service which the Troy engines have gained.

Troy engines are especially adapted for and give excellent service in driving:

Stokers	Generators
Fans	Compressors
Positive Pressure Blowers	Dryers
	Scrubbers
Centrifugal Pumps	Auxiliary Equipment in large plants
Rotary Pumps	

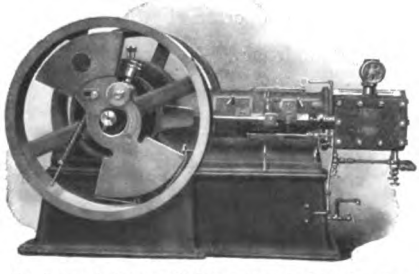
The standard Troy Engines are listed below. Column P gives the maximum usual pressure and Column S the number of sizes made.

SEE OUR ADVTS. IN MECHANICAL ENGINEERING THE JOURNAL OF THE A.S.M.E.

Troy Engines	P	S
Vertical Automatic	80–160	13
Horizontal Automatic	80–160	8
Vertical Direct-Connected	80–160	13
Horizontal Direct-Connected	80–160	8
Vertical Throttling	80–160	14
Horizontal Throttling	80–160	9
Vertical Low-Pressure	10– 40	10
Horizontal Low-Pressure	10– 40	6

All the above are made either enclosed and self-oiling, or open with gravity lubrication.

Sizes—2 to 200 H. P.



Horizontal Automatic Type for Belted Service



Special Type of Vertical Throttling for D. C. to Fan or Blower

All Troy Engines are built in the center-crank type and of compact and symmetrical design. The cylinder, frame and base are independent parts, machine fitted and interchangeable.

The **Base** is of a heavy substantial pattern enclosed for the collection of oil and water.

The **Frame** is of heavy construction and forms the main bearings. These are lined with the best genuine babbitt metal.

The **Cylinder and Steam-Chest** are one casting built generously to stand a stipulated steam pressure.

The **Valves** are of the balanced type—always steam-tight.

The **Piston** is a single casting; cored center to lighten. Grooved and provided with removable packing rings to make piston steam-tight.

The **Crosshead** is adjustable to take up wear and is provided with thorough lubricating passages.

The **Crankshaft** and **Connecting Rod** are steel forgings. The Connecting Rod is extra long to minimize friction, save power and lengthen life of bearings.

The **Self-Oiling System** (patented) thoroughly lubricates, saves oil and operates automatically. The bearings run in oil, minimizing wear, and the cost of lubrication is less. The oil pump and the check valve are designed especially for this service.

There are three types of engines made: Low Pressure for steam from 10 to 35 lbs., Standard for steam at from 60 to 160 lbs. and Special engines to take care of pressures exceeding 160 lbs. and to operate on superheated steam.

Each order receives personal attention so as to adapt the engine in the nicest possible manner for the service it has to perform. Blue prints giving general dimensions can be furnished to permit you to run lines, make foundation, etc.

Catalogs mailed you upon request. Our engineering staff is also at your service in aiding you to select the proper equipment.

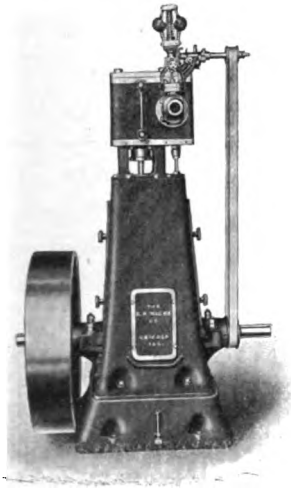
Digitized by Google

THE E. H. WACHS COMPANY

1525 DAYTON ST., CHICAGO, ILL., U. S. A.

Manufacturers of Vertical Steam Engines

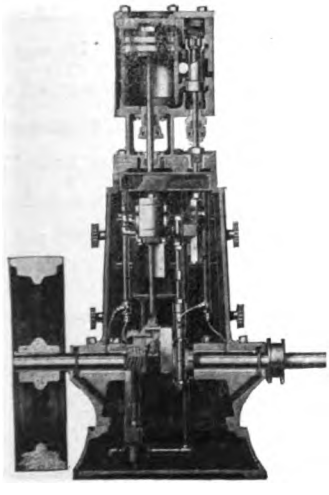
FULLY ENCLOSED AND SELF-OILING:
Sizes—4″x5″ to 11″x10″.



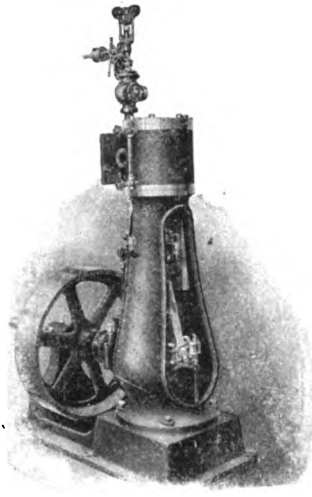
This engine is of exceptionally heavy design and liberal proportions. The fully enclosed feature makes it dust and oil proof.

The oiling system is of the gravity type supplied by an oversize pump in base, thus assuring abundant lubrication.

Built for severe service with minimum attention.



STANDARD OPEN-TYPE ENGINES:
Oil cup lubrication.



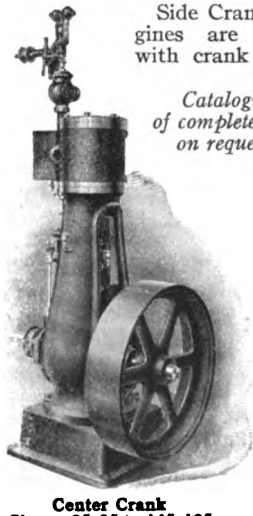
Side Crank
Sizes—3″x3″ to 5½″x7″

Shafts and connecting rods are solid steel forgings.

Center Crank Engines designed to operate at very high speeds have counter-balanced crank shafts.

Side Crank Engines are fitted with crank discs.

Catalogue of complete line on request.



Center Crank
Sizes—3″x3″ to 14″x16″

Digitized by Google

THE VILTER MANUFACTURING CO.

1194–1196 CLINTON ST., MILWAUKEE, WISCONSIN, U. S. A.

Builders of Ice Making and Refrigerating Machinery, Corliss Engines, Poppet Valve Engines, Ammonia Valves and Fittings, Ammonia Condensers, Special Machinery, Etc.

BRANCH OFFICES

220 Broadway NEW YORK, N. Y.	324 Finance Bldg. KANSAS CITY, MO.	2723 Bennett Court ST. LOUIS, MO.
1619 Chestnut St. PHILADELPHIA, PA.	731 Monadnock Bldg. CHICAGO, ILL.	28 West Broadway SALT LAKE CITY, UTAH
2582 West View Drive SEATTLE, WASH.	314 Curry Bldg. PITTSBURGH, PA.	419 Commercial Bank Bldg., HOUSTON, TEXAS
2650 Santa Fe Ave. LOS ANGELES, CAL.	Wellington NEW ZEALAND	O'Reilly 9 HAVANA, CUBA
707 Globe Bldg., MINNEAPOLIS, MINN.	203 2nd St., DES MOINES, IA.	112 So. Gordon St., ATLANTA, GA.

VILTER TANDEM COMPOUND POPPET VALVE ENGINE:



Fig. 1

Fig. 1. Vilter Tandem Compound Engine shown with poppet high pressure and Corliss low pressure cylinder direct connected to Rolling Mill type compressor. The most economical combination known using high pressure superheated steam. A leading feature is the valve gear operated through wrist plates driven from eccentrics.

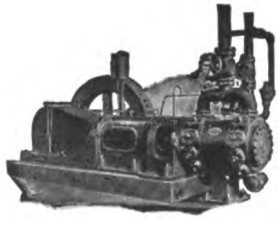


Fig. 2

Fig. 2. Vilter horizontal high speed ammonia compressors are simple in design, rugged in appearance, and in the character of service they give. They are specially designed for direct connection to the newest types of high-speed prime movers, and particularly adapted for direct connection to synchronous motors, a method of drive which is proving so highly economical and efficient.



Fig. 3

Fig. 3. The Rolling Mill frame Ammonia Compressor is built along very heavy lines for all conditions of service. It is used with only slight modifications in all sizes of compressors. Its very appearance gives assurance and proof of its strength and reliability. All parts of the base rest upon the foundation, thus giving uniform distribution of the load and insuring maximum stability and rigidity.

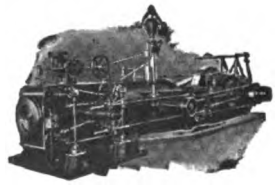


Fig. 4

Digitized by Google

Fig. 4. The Rolling Mill type Corliss Engine is of massive construction throughout, the pillow block and guide being made in one casting, securing great strength and rigidity. It is adapted to any class of service from a steady belted load to direct connected electrical service.

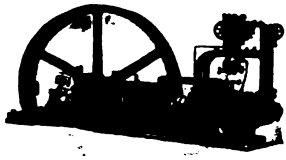


Fig. 5

Fig. 5. The belt-driven machines are furnished in either single or duplex units. These units may be driven by electric motor, gas or oil engines, etc. Single units built in sizes from 6 to 375 tons daily refrigerating capacity, duplex units in sizes from 12 to 750 tons daily refrigerating capacity.

SMALL VERTICAL TWIN CYLINDER AMMONIA COMPRESSORS:



Fig. 6

Fig. 6. A small, single-acting compressor, especially designed for users of comparatively small quantities of refrigeration. It is reasonable in first cost. Economical to operate. Simple in construction. Needs very little attention. Is always ready for service. Built in sizes from 1 ton to 20 tons daily refrigerating capacity.

VILTER LOW TEMPERATURE COMPRESSION SYSTEM:

A system manufactured under D. I. Davis patents whereby extremely low temperatures are efficiently and economically produced with compression refrigerating machinery. The simple ammonia compression machine has been conceded as both expensive and uneconomical for low temperature work. These detrimental features are overcome by the Low Temperature Compression System by the following methods:

(1) Multistage compression, which increases volumetric efficiency and reduces the power required for operating the compressors.

(2) Cooling the liquid before entering the low temperature refrigerator, thus reducing amount of gas handled by low pressure compressor and power per ton of refrigeration—because the work of cooling is handled by the high pressure cylinder.

(3) Intermediate gas cooling.

(4) Proper traps, etc.

LITERATURE:

Bulletins, catalogues and full data regarding our products mailed on request.

SEE OUR ADVTS. IN MECHANICAL ENGINEERING THE JOURNAL OF THE A.S.M.E.

Digitized by Google

GENERAL ELECTRIC COMPANY

GENERAL OFFICE: SCHENECTADY, N. Y.

Manufacturer of Complete Electric Power Equipment and Supplies

ADDRESS THE NEAREST G. E. SALES OFFICE

Akron, Ohio	Denver, Colo.	Little Rock, Ark.	Richmond, Va.
Atlanta, Ga.	Des Moines, Iowa	Los Angeles, Cal.	Rochester, N. Y.
Baltimore, Md.	Detroit, Mich.	Louisville, Ky.	St. Louis, Mo.
Birmingham, Ala.	Duluth, Minn.	Memphis, Tenn.	Salt Lake City, Utah
Bluefield, W. Va.	Elmira, N. Y.	Milwaukee, Wis.	*San Antonio, Tex.
Boston, Mass.	Erie, Pa.	Minneapolis, Minn.	San Francisco, Cal.
Buffalo, N. Y.	*El Paso, Tex.	Nashville, Tenn.	Schenectady, N. Y.
Butte, Mont.	Fort Wayne, Ind.	New Haven, Conn.	Seattle, Wash.
Charleston, W. Va.	Grand Rapids, Mich.	New Orleans, La.	Spokane, Wash.
Charlotte, N. C.	Harrison, N. J.	New York, N. Y.	Springfield, Mass.
Chattanooga, Tenn.	Hartford, Conn.	Newark, N. J.	Syracuse, N. Y.
Chicago, Ill.	*Houston, Tex.	Niagara Falls, N. Y.	Tacoma, Wash.
Cincinnati, Ohio	Indianapolis, Ind.	*Oklahoma City, Okla.	Terre Haute, Ind.
Cleveland, Ohio	Jackson, Mich.	Omaha, Neb.	Toledo, Ohio
Columbus, Ohio	Jacksonville, Fla.	Philadelphia, Pa.	Trenton, N. J.
*Dallas, Tex.	Joplin, Mo.	Phoenix, Ariz.	*Tulsa, Okla.
Dayton, Ohio	Kansas City, Mo.	Pittsburgh, Pa.	Washington, D. C.
	Knoxville, Tenn.	Portland, Ore.	Worcester, Mass.
	*Southwest General Electric Company.	Providence, R. I.	Youngstown, Ohio

For business outside of the United States address:

INTERNATIONAL GENERAL ELECTRIC COMPANY, INC.

NEW YORK, N. Y., 120 Broadway — SCHENECTADY, N. Y

G-E PRODUCTS:

The products of the General Electric Company comprise practically all apparatus and machinery used in the generation, transmission, distribution and use of electrical energy. It is practicable, therefore, to standardize with G-E electrical equipment.

AUTOMATIC STATIONS:

G-E automatic station control equipment offers opportunity for new and important economies in the generation, control and distribution of electrical energy. It is now operating in more than 100 stations. Bulletins 47730 and 40604 give more information.

G-E WATER WHEEL DRIVEN GENERATORS:

Both horizontal and vertical units individually designed to meet most efficiently the various requirements imposed by the supply of water available. Sizes range from 30 to 40,000 kv-a. (Bulletin 40601.)

TURBINE DRIVEN GENERATORS:

As manufactured by the General Electric Company, Curtis steam turbines are distinguished by their low cost of operation and reliable service. They can be furnished either condensing or non-condensing. Built in sizes of 10 kw. upward for d-c. generators (Bulletin 42010) and 100 kw. upward for a-c. generators. (Bulletin 42201.)



G-E Turbine Generator Headlight Sets are designed especially for locomotive headlight service but are used also for other applications, such as to furnish current for lighting around steam shovels, derricks, wrecking cranes, launches, and tug boats.



STEAM ENGINE DRIVEN GENERATING SETS:

Designed to meet severe conditions of marine work which demand light, compact, and durable sets of close regulation and quiet operation. Used also for small, isolated plants requiring up to 72 kw. (Bulletin 42300.)

MOTOR GENERATOR SETS:

Units developed in many sizes and types and adapted to all purposes—railway and mine service, excitation, battery charging, etc. (Bulletin 42552A.)

G-E SWITCHBOARD EQUIPMENT:

A complete line of switchboards and switchboard devices for all systems of electrical distribution.

Standard Unit Panels have been developed to meet certain conditions which have been found to occur repeatedly. These panels may be ordered by catalog number from descriptive bulletins mailed on request. They are less expensive than other classes, requiring less time to build and ship.

Digitized by Google

GENERAL ELECTRIC COMPANY SCHENECTADY, N. Y.

This company has given much time to questions of safety in switchboard design and has developed several types of safety enclosed panels, which have proved very successful in service. Address the nearest G-E sales office for information.

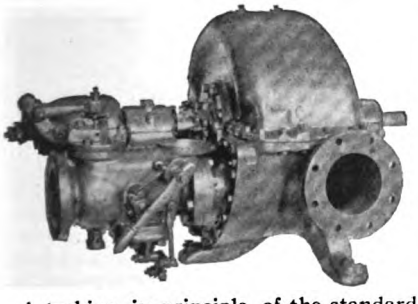
G-E FLOW METERS:



G-E flow meters provide a means of accurately measuring the flow of steam, water, air, gas or oil, through pipes and thus furnish information of great value in the economical management of any industry or central station. They are built in several types for different classes of service.

The steam flow meter is adapted for measuring the amount of steam generated by a boiler plant or the amount distributed for various purposes. It can be used for equalizing the load on individual boiler of a battery or for discovering losses. The water flow meter is used to measure boiler feed water, the input to water turbines, or the output of pumping plants. (Bulletin 46501D.)

MECHANICAL DRIVE TURBINES:



A turbine, in principle, of the standard G-E Curtis type. Primarily adapted for driving centrifugal pumps, blowers, and similar machines, from 10 to 400 h.p. capacity. It may be arranged to operate at steam pressures from 50 to 300 lb., with or without superheat, and either condensing or non-condensing.

COMPRESSORS AND BLOWERS:

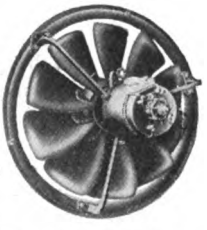
G-E centrifugal blowers or compressors are designed for large volumes and low pressures, such as are required for oil and gas burning furnaces, foundry cupola blowing, pneumatic conveying systems and agitating of liquids. These blowers are similar in design to the centrifugal



pump. They are direct connected to d-c. or a-c. motors or Curtis steam turbines. (Bulletin 48609.)

G-E Reciprocating Compressors are particularly applicable for blowing out machinery in industrial plants. These are built with either induction motors or d-c. motors and are furnished either portable or stationary, complete with automatic pressure governor, reservoir, line switch, fuses, and pressure gage.

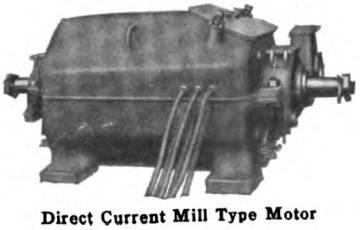
G-E Exhaust Fan Outfits are self-contained units adapted for ventilating or for removing steam, dust, smoke or obnoxious gases and fumes. Sizes from 12½ in. to 48 in. diameter. Capacities range from 750 to 25900 cu. ft. of air per minute. (Bulletin 41801.)



MOTORS AND CONTROL:

This Company builds electric motors for every kind of service and also a complete line of motor control equipment. A few of the many types of G-E motors are described here. For further information consult the nearest G-E sales office or send for bulletins referred to.

Information on applications of automatic control equipment should be obtained from industrial control specialists in the nearest G-E sales office.



Direct Current Mill Type Motor

(Continued on next pages)

Digitized by Google

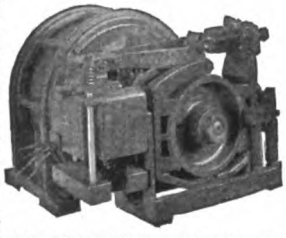
(Continued from preceding pages)

GENERAL ELECTRIC COMPANY SCHENECTADY, N. Y.

Mill Type Motors of special design for severe mill service, such as driving cranes and reversing auxiliary machinery in steel plants. They can be applied also to ore and coal bridges and unloaders, charging machines of all types, small heavy duty hoists, electric shovels, dipper dredges, canal locks and draw and lift bridges. (Bulletins 48143.1 and 48121.1.)

Type CO 1800 d-c. Crane and Hoist Motors are designed for intermittent service requiring a maximum torque motor of ample overload capacity. Made for floor, wall and ceiling mounting and parts are arranged to facilitate easy repair and inspection. Sizes from 2 to 100 h. p., standard voltages. Electric brakes can be supplied. (Bulletin 68100A.)

Type MTC a-c. Hoist Motors are used for hoists and similar service of an intermittent nature where the limiting feature depends upon the frequent starting and accelerating torque required. Regularly furnished with open frames and with taper shafts on each end for gear and solenoid brake. Made 2- and 3-phase, from 1 to 300 h.p. (Bulletin 68102.)



A-C. Hoist Motor and Electric Brake

Type KT Constant Speed Induction Motors in sizes from ½ to 750 h.p., standard voltages, are adaptable for driving all classes of machines requiring constant speed. (Bulletin 41302A.)

Special high-speed types have been developed for operation up to 25,000 r.p.m. They have been successfully applied to woodworking machines requiring speeds up to 12,000 r.p.m. They can be made an integral part of machine. (Bulletin 41521A.)

G-E Synchronous Motors, while they may be applied to most any industrial service, are of most value when used on circuits with a need for power factor correction. They are particularly desirable where dusty operating conditions make a motor with a small air gap inadvisable.

G-E machines, covering a wide range of speeds and capacities, are in extensive use throughout many industries, driving rolls, compressors, pumps, grinders, crushers, blowers, fans and conveyors.

Type RC Constant Speed d-c. Motors are especially designed to meet the majority of conditions and may be classed as the universal d-c. motor. Made open, semi-enclosed and totally enclosed in sizes from ½ to 200 h.p. (Bulletin 41013A.)

Type RF Adjustable Speed d-c. Motors have been designed for machine tool and similar service where wide variation in speed independent of load is required. Made in sizes from 2 to 50 h.p. (Bulletin 41021A.)

G-E Fractional Horsepower Motors are made in several types for alternating or direct current with ratings from 1/200 h.p. upward. (Bulletins 61509 to 61512.) This Company has studied extensively problems of motor applications to small tools, etc., and is in a position to help other manufacturers who have small-tool power application problems.

FABROIL GEARS AND PINIONS:



Fabroil gears, which are made from cotton, are superior to all other non-metallic gears by virtue of strength and a measure of elasticity, which allows meshing teeth to come to a good bearing across the full width of the face and absorbs shock or rapid variation of torque.

Because of their noiseless operation, long life and high-tooth strength Fabroil gears are applicable to machine tools and other heavy machinery, as well as textile mill machinery, printing machine mechanisms and automobile timing gear trains. (Bulletin 48703A.)

INDUSTRIAL ELECTRIC LOCOMOTIVES:

The electric locomotive is admirably adapted to fulfill the transportation requirements of all industries and possesses many advantages over steam locomotives, animal haulage and hand trucks.

G-E industrial locomotives are of the single or double truck type. They are made for different gages and in a wide range of sizes. Units in industrial service of many kinds are illustrated in Bulletin 44251.

Digitized by Google

GENERAL ELECTRIC COMPANY SCHENECTADY, N. Y.

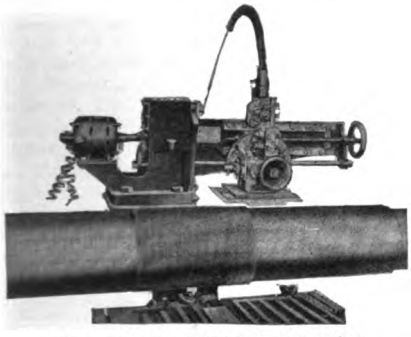
ARC WELDING EQUIPMENT:

The General Electric Company has developed arc welding equipment to meet almost every condition where it is possible to join metals by means of the electric arc. (Bulletin 48932A.)

Constant Energy Sets are primarily single-operator units. The generator, which may be driven by any standard form of power, is designed for metallic electrode welding only, but may be used intermittently for carbon electrode welding.

Constant Potential Sets enable more than one welding circuit to be operated simultaneously without interference with each other. The generators are built in several capacities and can be furnished for drive by any suitable electric motor, engine or belt.

Automatic G-E Arc Welder is a mechanical device to feed automatically a metallic electrode to the work. It is readily attached to machine tools to build up flat or cylinder surfaces, or for welding

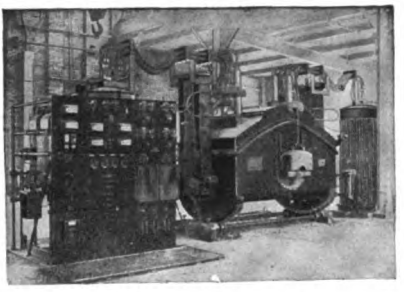


Automatic Arc Welder Installed for Building Up Undersized Shaft

seams in pipes and tanks. It may be operated from either of the welding generators above mentioned, or from any constant potential d-c. source of power. (Booklet B3575.)

ELECTRIC FURNACES:

The G-E electric furnace for melting non-ferrous metals and alloys provides a clean, intense heat, well distributed and perfectly controlled. Its use has helped to revolutionize the alloying of metals. The General Electric Company can supply also all electrical equipment needed in connection with any type of electric arc furnace. (Bulletin 48710B.)



G-E Electric Melting Furnace and Control

ELECTRIC HEAT TREATING EQUIPMENT:

The G-E Electric Muffle Furnaces meet the demand for a convenient, economical and durable furnace for heat-treating carbon steel and for experimental purposes. (Bulletin 69702.)

For heat-treating processes requiring temperatures from 900 to 1800° F., this Company has developed electric heating equipment which is adapted to either horizontal or vertical cylindrical furnaces. (Bulletin 69705.) Furnaces sold and installed by licensed furnace builders.

G-E Oil Tempering Baths for tempering carbon steels are safe, efficient, and easy to operate. They heat up very quickly and can be held at any temperature. Made in different sizes. (Bulletin 69700.)

Other G-E electric heating devices are: electric soldering irons, Booklet B3571; soldering iron furnaces, Bulletin 69702; compound melting pots, Bulletin 69109; solder melting pots, Bulletin 69703; and electric glue pots, Bulletin 69100.

ELECTRIC RIVET HEATERS:



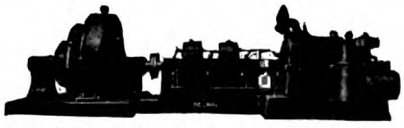
Electric rivet heaters possess many advantages over fuel fired furnaces, such as portability, economy of power used, successful heating, and elimination of fire hazard. The G-E electric rivet heater can be provided with wheels at a small additional cost. The power consumption varies from 17 to 20 kw-hr. per 100 lb. of rivets, depending upon the size and composition of the rivets. (Bulletin 69701.)

Digitized by Google

DE LAVAL STEAM TURBINE COMPANY

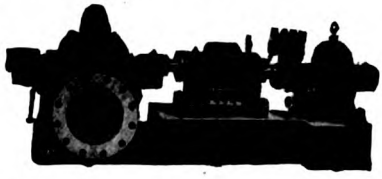
TRENTON, N. J.

Builders of Steam Turbines, Centrifugal Pumps and Blowers, Speed-Reducing Gears and Special Centrifugal Machinery



Direct-Current Generator, Driven by De Laval Geared Steam Turbine; 1,200 Kw.

DE LAVAL STEAM TURBINES are of the single-stage, velocity-stage and pressure-stage types, and are built for all steam and exhaust conditions and in all capacities up to 15,000 h. p.



De Laval Geared Turbine-Driven Centrifugal Circulating Pump

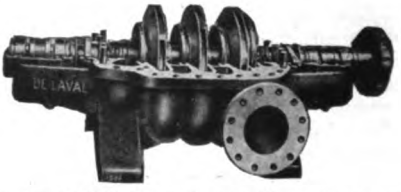
DE LAVAL CENTRIFUGAL PUMPS are built for all capacities and pressures, from boiler feeders to geared turbine-driven pumping units of the largest size, and for all methods of driving, including electric motor, and directly connected and geared steam turbines. De Laval steam turbine-driven centrifugal pumps hold the highest records for efficiency and duty.



De Laval Turbine-Driven Multi-Stage Compressor; 14,650 Cu. Ft. per Min., from 10 In. Water Column Vacuum to 8 Lbs. Per Sq. In. Gage

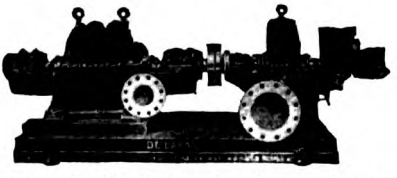
DE LAVAL CENTRIFUGAL COMPRESSORS are built in all capacities and for all pressures up to 125 lbs. per sq. in. for both motor and steam turbine drive. Close regulation for either constant pressure or constant volume is secured by sensitive, but simple and rugged, governors.

THE DE LAVAL DOUBLE-HELICAL SPEED REDUCING GEAR has been perfected and fully tested by extensive use. Over 2,000,000 h. p. of De Laval gears are now giving wholly satisfactory service. The De Laval Gear is free from noise and vibration in operation, and shows an efficiency above 98%. Speed ratios up to 20 to 1 can be secured in one reduction.



De Laval Multi-Stage Pump with Casing Cover Removed

THE DE LAVAL METHOD OF MANUFACTURE—De Laval Steam Turbines, Centrifugal Pumps, Blowers, Compressors and Speed-Reducing Gears are built in a shop producing solely high grade turbine and centrifugal machinery. Designs and methods have been developed and perfected by continuous specialization upon this class of work for over 25 years. Only high-grade materials are used, and skilled men, trained in this class of work, are employed throughout. All parts are made to limit gages upon an interchangeable basis, and repair parts can be placed in machines by ordinary attendants without requiring to be fitted. All machines are guaranteed as to capacity and efficiency, and are given a thorough test before leaving the shops.



De Laval Turbine-Driven Centrifugal Boiler Feed Pump; 800 Gal. Per Min. against 520 Ft. Head

State the requirements of service, so that our Engineering Department can suggest the best solution of your power, pumping and air-compressing problems.

Digitized by Google

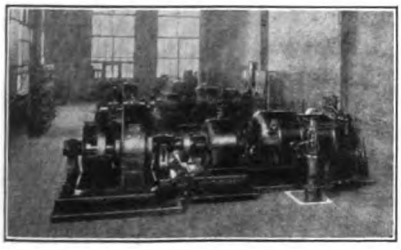
KERR TURBINE COMPANY

WELLSVILLE, N. Y.

Offices in All Large Cities

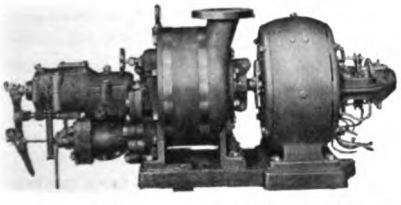
Manufacturers of Kerr Economy Steam Turbines and Reduction Gears

KERR ECONOMY STEAM TURBINES:



500 Kw. and 750 Kw. Kerr "Economy" Bleeder Type D. C. Turbine-Generators, Niles-Bement-Pond Co., Plainfield, N. J.

Made in the following types: Velocity stage, multi-pressure stage or combination velocity multi-pressure stage. Our flexibility of design and construction permits of economical operation on any combination of initial and exhaust pressures, without special design or excessive cost. A sufficient number of stages can always be offered to insure good economy with low steam velocities and consequent absence of bucket erosion, resulting in exceptionally low interest and depreciation charges.

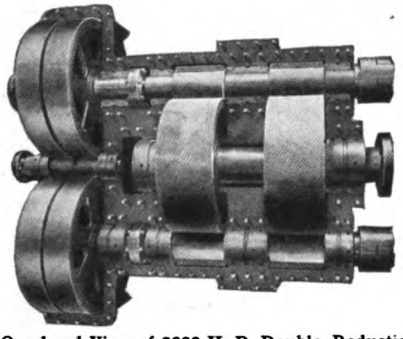


Small Kerr "Economy" Direct Current Turbo-Generator Set

Kerr Economy Steam Turbines can be offered for operation under any of the following conditions:

High pressure condensing.
High pressure non-condensing.
High pressure condensing permitting of automatic steam extraction.
Low, or mixed pressure.

KERR ECONOMY REDUCTION GEARS:



Overhead View of 3000 H. P. Double Reduction Marine Gear, 3600–90 R. P. M.

Cut on the most accurate gear hobbing machines obtainable. A wide range of sizes insures the same flexibility that is the salient feature of Kerr Economy Turbines.

KERR ECONOMY PROPULSION MARINE TURBINES:

Made in the combination velocity multi-pressure stage type. The turbine proper may contain a single rotating element, or may contain two rotating elements, a high pressure and a low pressure, forming what is known as the cross-compound type. The speed of the turbine is reduced to the speed at which the propeller operates by means of a set of Kerr Economy Reduction Gears. These gears may be furnished for either single or double reduction, as desired by the Purchaser.

Our smaller turbines are especially well suited for driving marine type generators, pumps and blowers. Our numerous installations have proven their thorough reliability.

SEE OUR ADVTS. IN MECHANICAL ENGINEERING THE JOURNAL OF THE A.S.M.E.

Digitized by Google

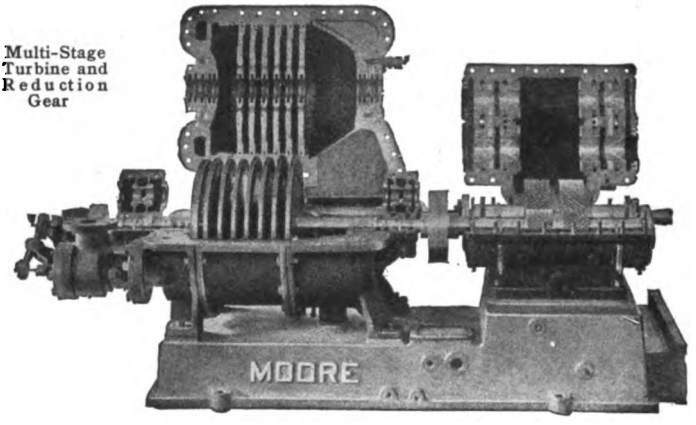
MOORE STEAM TURBINE CORP'N

WELLSVILLE, NEW YORK

DISTRICT OFFICES

New York	Birmingham	Boston	Pittsburgh	St. Louis
Chicago	Cleveland	Seattle	Philadelphia	St. Paul
		San Francisco		

Manufacturers of Single- and Multi-Stage Steam Turbines, Condensing and Non-Condensing



Multi-Stage Turbine and Reduction Gear

TURBINE DRIVE ADVANTAGES:

Steam turbines possess many advantages over the reciprocating steam engine. Simplicity of design and operation favors the turbine. The turbine motion is continuously rotary—not a conversion of reciprocating motion to a rotary one with an attending loss of energy and wear of parts. The turbine also saves in oil and waste. Floor space is another point in support of the choice of a turbine.

THE MOORE STEAM TURBINE:

A steam turbine designed upon the sturdy basis of sound theory and practice by men of long and tested experience means a dependable, efficient prime mover. Moore Steam Turbines are dependable and efficient in principle and operation.

The most efficient type of steam turbine is known as the combination type, that is one type of turbine for the high pressure part of the expansion, combined with another type for the low pressure stages. Moore Steam Turbines are built on this plan.

Types: Moore Steam Turbines are made single- and multi-stage condensing and non-condensing types.

The single-stage type is the simpler form designed for small units. Moore turbines are designed for low speeds, so as to minimize gear troubles and lower rotation stresses. "Turbine Explosions" are designed out of the Moore Steam Turbine.

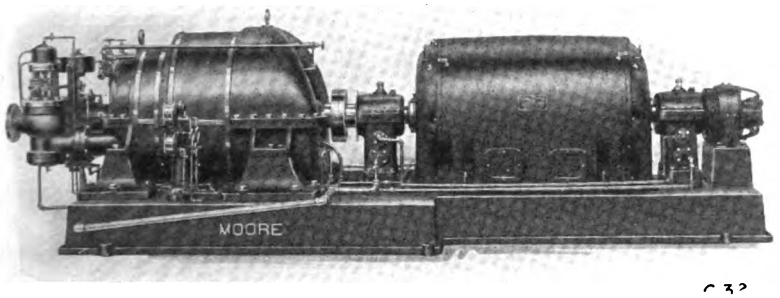
The multi-stage type consists of a single velocity stage with two or more single pressure stages.

All our turbines are manufactured on the quantity production basis, thus lowering their cost and at the same time producing precision parts for stock and assembly rooms. Thus stock parts are always on hand and always fit.

Sizes: Our turbines are built in sizes from 5 to 1000 H. P.

Digitized by Google

MOORE STEAM TURBINE CORP'N WELLSVILLE, N. Y.



Direct Connected Alternator Units up to 1000 KW., Condensing or Non-Condensing. Oil Relay Governor. Forced Feed Lubrication

CONSTRUCTION:

The Turbine Casings and Diaphragms are permanently joined and the combination is split horizontally. The two, as a unit, may be removed, for inspection.

The Rotor is a single velocity stage wheel carrying two or three rows of moving buckets, followed by two or more steel pressure stage wheels, all mounted on the same steel shaft. The first stage wheel is of solid forged construction.

The Buckets are of steel, perfectly smooth, and are removable for renewal.

The Nozzles: First Stage are cast bronze: diverging expanding type. Second and following Stages are sheet metal strips cast into diaphragms.

Reversing Vanes are used between the rows of moving buckets of the first stage wheel.

Bearings: High speed service; ring or forced lubrication, or both; size and operating conditions governing.

Adjustable thrust bearings are provided.

Coupling: Latest improved flexible type.

Oil relay or direct connected type.

Governors: Are used depending on size of turbine and service.

Carbon Packing is provided, brass shrouded for protection. Packing will not cut shaft; steam-tight when properly fitted.

Gearing: Moore Double Helical Reduction Gears are solid forgings or carbon steel rings shrunk on C. I. centers. The Pinions are chrome nickel or chrome vanadium steel forgings. Heavy Babbitted Bearings with forced lubrication.

POINTS OF SUPERIORITY:

1. **High efficiency.** Through using a velocity stage wheel followed by single pressure stages.
2. **Low steam velocity.** Due to multi-staging.
3. **Accessibility.** All sizes designed with horizontally-split casing.
4. **Emergency Governor.** On all turbines.
5. **Carbon packing.** Protected against breakage.
6. **Moderate speeeds.**
7. Improved method of attaching Diaphragms.
8. Smooth Buckets with perfect alignment.

WE ARE PREPARED TO QUOTE ON:

Condensing and non-condensing single- and multi-stage steam turbines—5 to 1000 H. P.

Bleeder Turbines.

Double Helical Reduction Gears.

Turbo Alternator Units.

Geared and Direct Connected Turbo-Generator Units, Turbo Blowers, and Turbo Pumps.

Geared Belted Turbines.

Consult our engineers, always at your service. They give their advice and make recommendations, without placing you under any obligations.

Send for Bulletin No. 24.

SEE OUR ARTICLE IN MECHANICAL ENGINEERING

Digitized by Google

THE TERRY STEAM TURBINE CO.

MAIN OFFICE AND WORKS, HARTFORD, CONN., U. S. A.

BRANCH OFFICES

Atlanta, Ga., 1521 Candler Bldg.
Birmingham, Ala., 3 South 20th St.
Boston, Mass., 141 Milk St.
Chicago, Ill., 1328 McCormick Bldg
Cleveland, Ohio, 436 Engineers Bldg
Denver, Colo., First Nat. Bank Bldg.
Detroit, Mich., 715 Dime Bank Bldg.
Fort Worth, Tex., 608 Flatiron Bldg.
Grand Rapids, Mich., Michigan Trust Bldg.
Houston, Tex., 423 Southern Pacific Bldg.
Kansas City, Mo., Reliance Bldg.
Los Angeles, Cal., 625 Washington Bldg.
New York, N. Y., 95 Liberty St. & 90 West St.
Memphis, Tenn., 24 South Front St.
Minneapolis, Minn., 423 South Front St.
New Orleans, La., 525 Baronne St.
Philadelphia, Pa., Maxwell Bldg., 16th & Walnut Sts.
Pittsburgh, Pa., 816 Oliver Bldg.
Richmond, Va., 301 American Nat. Bank Bldg.
San Francisco, Cal., 1070 Folsom St.
Seattle, Wash., 220 Railway Exchange Bldg.
St. Louis, Mo., 1607 Chemical Bldg.

PRODUCTS:

Steam Turbines, 1 to 1,000 H.P., condensing or non-condensing.

Centrifugal Turbo-Pump Sets for all classes of service.

Turbo-Generator Sets, D. C. or A. C., direct connected or through Terry Reduction Gears.

Duplex Exciters.

Turbo-Blowers for forced or induced draft.

Reduction Gears, combined Turbo-Gear Units.

TERRY STEAM TURBINES:

Principle of Operation: The outstanding feature which makes the Terry Turbine so simple and reliable is its principle of operation. Steam issuing from an expanding nozzle at high velocity enters the bucket of the single Terry wheel in which its direction is reversed 180°. As this single impact uses but a portion of the available energy, the steam is caught by a reversing chamber and returned again and again to the same wheel until all of the available energy is utilized. This principle of operation permits using but one wheel, which is made from a solid forging with buckets milled out of the solid metal. Fine blade clearance is not necessary (1/8" or more) and lateral clearance is very large (over 1").



Fig. 1. INDESTRUCTIBLE WHEEL OF TERRY TURBINE
Buckets cut from the solid and protected from rubbing by raised wheel rim. Notch at center of blade reduces blade weight and stresses. Wheel can not burst and injure operators

DUPLEX EXCITERS consist of an exciter generator driven at one end by a motor and from the other end by a specially governed Terry Turbine so arranged that should anything happen to interrupt the current to the motor, or should the motor fail, the Terry Turbine will immediately take the entire load. This unit offers many advantages of safety and overall plant efficiency.

TURBO BLOWER UNITS for forced and induced draft service, either geared

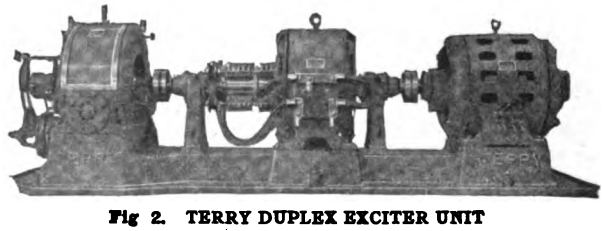


Fig 2. TERRY DUPLEX EXCITER UNIT
Insures continuous excitation, and is used extensively because of reliability and adaptability to automatic heat balance

Digitized by Google

or direct connected, depending upon draft requirements. This turbine drive obviates the objectionably large fans necessary with engine drive because of the low speed required by the engine for reliable service.

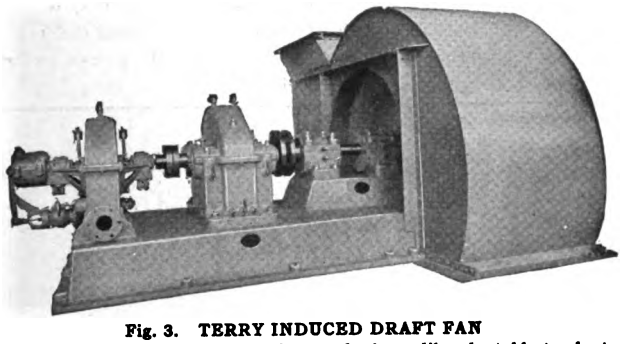


Fig. 3. TERRY INDUCED DRAFT FAN
Small space and light foundations make it readily adaptable to plant conditions. Its high speed avoids the necessity of large bulky fans

TURBO GENERATOR UNITS are furnished in sizes from 1 to 750 K. W., geared or direct connected, condensing or non-condensing, used extensively for main units in small plants or auxiliary sets for night lighting, week-end service, marine work, lifting magnets, etc., in large plants. In non-condensing work the turbine may be designed to exhaust against almost any back pressure desired for heating, manufacturing or other purpose.

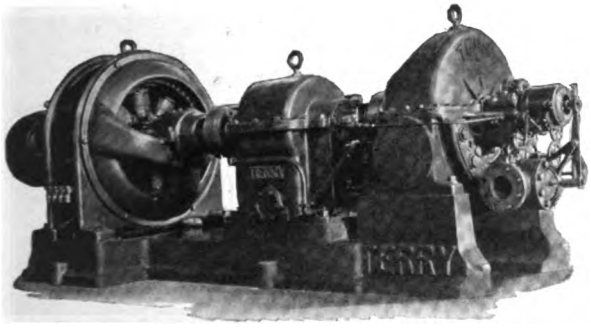


Fig. 4. TERRY TURBO-GENERATOR SET
D. C. units geared to permit high turbine speed and efficiency and low generator speed for good operating characteristics

CENTRIFUGAL TURBO PUMP UNITS are adapted to all classes of service including boiler feed, condenser circulation, hotwell, dredging, fire service, vacuum, water works and general service.

EXPERIENCE gained in over 7500 installations insures the purchaser against faulty workmanship, material or design. Write or 'phone the nearest district office.

SEE OUR ADVT. IN MECHANICAL ENGINEERING THE JOURNAL OF THE A.S.M.E.

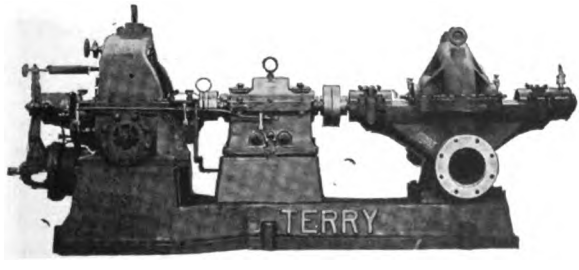


Fig. 5. TERRY CONDENSER CIRCULATING SET

Note the rugged appearance, compactness and simplicity. Where high efficiency is required, a Terry geared unit is used

Digitized by Google

Steam Turbines, Hydraulic Turbines, Centrifugal Pumps

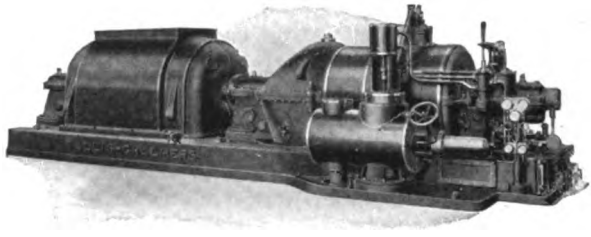
ALLIS-CHALMERS MFG. CO.

MILWAUKEE, WIS.

Sales Offices in All Principal Cities

NEW YORK OFFICE: 50 Church Street NEW ORLEANS OFFICE: Maison Blanche Bldg.

FOREIGN OFFICE: Paris



Standard 4000 K. W. Steam Turbine and Alternator Unit

Electrical Machinery

Steam Turbines

Steam Engines

Condensers

Hydraulic Turbines

Pumping Engines

Centrifugal Pumps

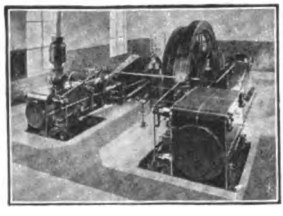
Gas Engines

Oil Engines

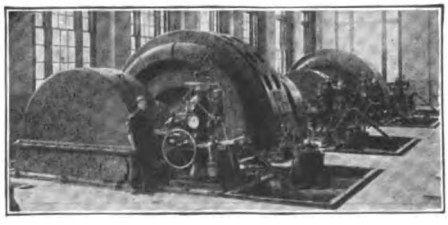
Mining Machinery

Metallurgical Machinery

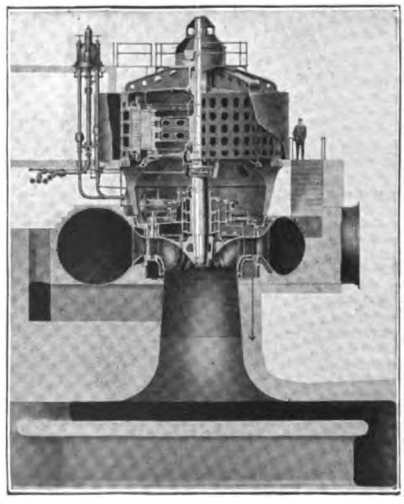
SEE OUR ARTICLE IN MECHANICAL ENGINEERING THE JOURNAL OF THE A.S.M.E.



Allis-Chalmers Cross Compound Engine, Direct Connected to an Allis-Chalmers Generator



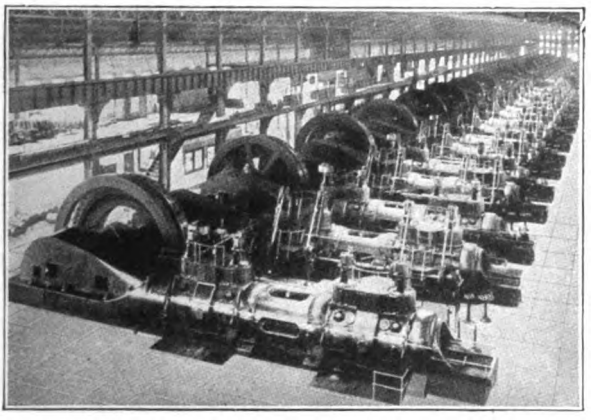
Allis-Chalmers Impulse Wheels: 46,000 H. P. Concentrated in Two Units, 2160 Foot Head, 375 R. P. M.



37,500 H. P. Vertical Hydro-electric Unit

Digitized by Google

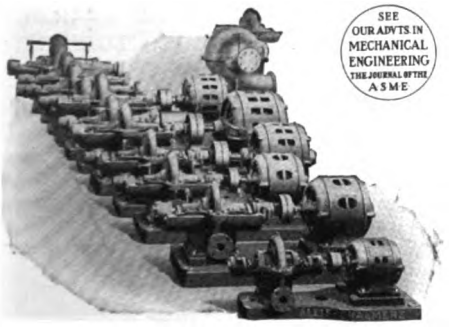
ALLIS-CHALMERS MFG. CO. **MILWAUKEE, WIS.**



Power House, Illinois Steel Company, Gary, Indiana

Crushing and Cement Machinery
Flour Mill Machinery
Saw Mill Machinery
Air Compressors
Air Brakes
Steam and Electric Hoists
Farm Tractors
Power Transmission Machinery
Timber Treating and Preserving Machinery

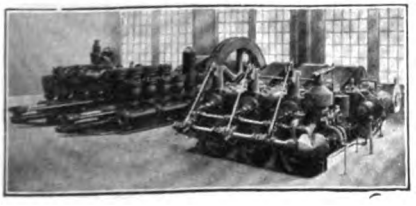
SEE OUR ADVTS IN MECHANICAL ENGINEERING THE JOURNAL OF THE A S M E



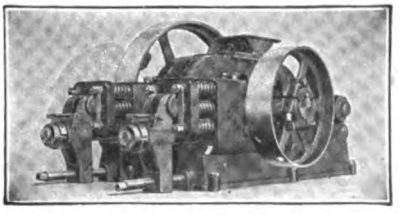
Type "S" Centrifugal Pump Connected to Type "AN" Motors



Style "K" Gates Rock and Ore Breaker



Allis-Chalmers Triplex Oil Engine, Direct Connected to Allis-Chalmers Plunger Pump



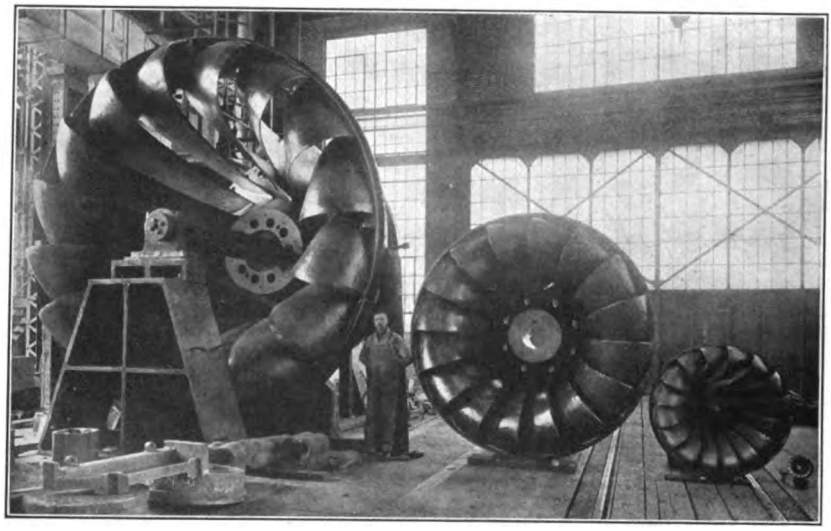
Allis-Chalmers "XX" Type Straight Line Crushing Rolls

Digitized by Google

THE WM. CRAMP & SONS SHIP & ENGINE BUILDING CO.

RICHMOND & NORRIS STS., PHILADELPHIA, PA.

Manufacturers of I. P. Morris Hydraulic Turbines



CONTRACTS AWARDED TO THIS COMPANY DURING THE YEAR OF 1920:

The Great Lakes Power Co., Ltd.,
Sault Ste. Marie, Ontario, Canada
3—2,400 HP. Turbines

The Parr Shoals Power Company, Columbia, S. C.
1—3,600 HP. Turbine

The Amoskeag Manufacturing Company
Manchester, N. H.
2—7,500 HP. Turbines

The Hydro-Electric Power Comm. of Ontario (Niagara Dev.), Ont., Can.
3—55,000 HP. Turbines

The Spanish River Pulp and Paper Mills, Ltd. (Smoky Falls Development),
Sault Ste. Marie, Ontario, Canada
2—2,600 HP. Turbines

The Southern California Edison Co. (Big Creek No. 8 Dev.), California
1—30,000 HP. Turbine

The War Department, U. S. of A. (Muscle Shoals Dev.), Florence, Ala.
4—30,000 HP. Turbines

The Alabama Power Company (Lock No. 12, Unit No. 6), Coosa River,
Ocampa, Alabama
1—19,500 HP. Turbine

The Great Northern Paper Company,
Millinocket, Maine
2—5,250 HP. Turbines

The Great Northern Paper Company,
Millinocket, Maine
2—5,500 HP. Turbines

The Washington Water & Power Company,
Spokane, Washington
1—14,250 HP. Turbine

CONTRACTS AWARDED TO THE DOMINION ENGINEERING WORKS, LIMITED, DURING THE YEAR OF 1920, FOR I. P. MORRIS TURBINES:

The Laurendite Company, Ltd.,
Grand Mere, P. Q., Canada
2—20,000 HP. Turbines

The Montreal Light, Heat & Power Cons.,
Cedar Rapids, P. Q., Canada
2—10,800 HP. Turbines

The Montreal Light, Heat & Power Cons.,
Cedar Rapids, P. Q., Canada
1—1,500 HP. Turbine

The Spanish River Pulp & Paper Mills, Ltd. (Smoky Falls Development),
Sault Ste. Marie, Ontario, Canada
2—2,600 HP. Turbines

The Spruce Falls Pulp & Paper Co.,
Kapuskasing, Ontario, Canada
4—2,900 HP. Turbines

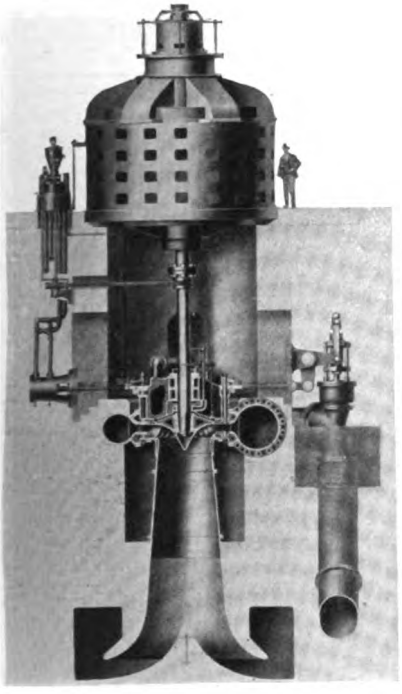
The Shawinigan Water & Power Co.,
Shawinigan Falls, P. Q., Canada
1—41,000 HP. Turbine

522,150 Horsepower to be delivered by I. P. Morris Turbines contracted for during the year of 1920.

This Company is now building Johnson Valves for the Larner-Johnson Valve & Engineering Co.

Digitized by Google

THE WM. CRAMP & SONS SHIP & ENGINE BUILDING CO.
PHILADELPHIA, PA.



30,000 H. P. TURBINE

Head 680 feet Speed 428 RPM

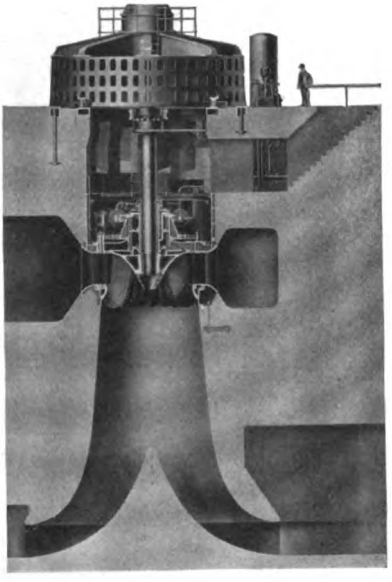
Designed and Built for

SOUTHERN CALIFORNIA EDISON COMPANY

Big Creek Plant No. 8.

SPECIAL FEATURES:

- Johnson hydraulic valve
- Spreading draft tube
- Automatic governor control
- Pneumatic lubricating system
- Disk guide vanes
- Labyrinth runner seals



30,000 H. P. TURBINE

Head 95 feet Speed 100 RPM

Four Turbines

Designed and Built for

U. S. GOVERNMENT

MUSCLE SHOALS DEVELOPMENT

SPECIAL FEATURES:

- Spreading draft tube
- Automatic governor control
- Pneumatic lubricating system
- Double acting shearing links

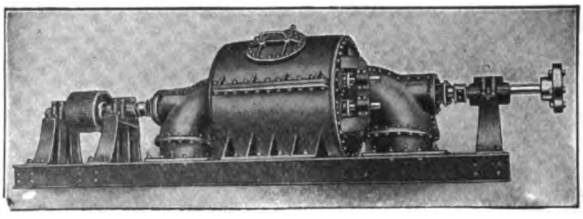
Digitized by Google

J. & W. JOLLY, INC.

Founded 1881

HOLYOKE, MASS.

Manufacturers of McCormick Holyoke Turbines, Paper Mill Machinery, Cut Gears Gray Iron Castings, General Machinery



McCORMICK HOLYOKE TURBINES:

Of high efficiency, designed for High or Low Heads, are built to the exacting requirements of our engineers for strength and durability.

McCormick Holyoke Turbines represent the best that skilled workmanship can produce, backed by over thirty years of experience in the designing and building of Water Wheels.

Now is the time to stop the leaks and make the country more efficient by harnessing the power of our streams that are going to waste every day.

Install McCormick Holyoke Turbines and save the coal.

We await the opportunity of figuring on your requirements.

Catalog sent on request.

ALSO MANUFACTURERS OF:

"White's" Patent Oscillating Screen

—

Rag Dusters

—

Rag Thrashers

—

Jordan Engines

—

Beating Engines

—

Stuff Pumps

—

Size Pumps

—

Elevators

—

Baling Presses

SEE OUR ADVTS. IN MECHANICAL ENGINEERING THE JOURNAL OF THE A.S.M.E.

Digitized by Google

THE JAMES LEFFEL & CO.

SPRINGFIELD, OHIO, U. S. A.

BRANCH OFFICES

BOSTON, 161 Devonshire Street
MINNEAPOLIS, Plymouth Building
ATLANTA, GA., Fourth National Bank Bldg.
NEW YORK, 39 Cortlandt Street

Manufacturers of Turbine Water Wheels, Steam Engines and Boilers

LEFFEL TURBINE WATER WHEELS:



Fig. 1. Vertical Turbine

Vertical Leffel Turbine Water Wheels: Equipped with latest type of Leffel steel bucket runners mounted on vertical steel shafts. The revolving parts of these turbines are carried on special design step bearings. The gate casings are fitted with balanced swing type gates, each gate removable separately and fitted with adjustable steel connections. The gates are operated with Leffel's latest type of gate equipment. The bearings are of special designs and large dimensions (Fig. 1).

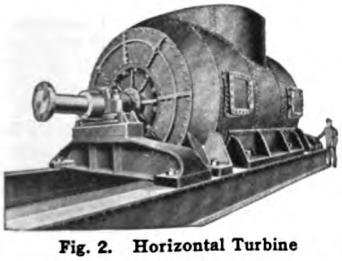


Fig. 2. Horizontal Turbine

Horizontal Leffel Turbines: Are built in various types and designs, single and double discharges. Frequently to suit requirements two or more turbines are built on one horizontal shaft, developing large horse power and high speeds, for direct connection to driven machinery. Some of these turbines are constructed with steel casings and others for open penstocks (Fig. 2).

Type "Z" Leffel Turbines: These turbines of special design for developing high speed, high horse power, high efficiencies, vertical and horizontal designs, for direct connection to electric generators, milling machines, saws, grinders, pumps and other high speed machinery. These turbines are of the most modern and latest designs in all details.

Governors: This Company also furnishes governors for regulating the speed of the different designs and capacities of turbine water wheels. These governors are of the very latest types and designs throughout.

Guarantee: All of the work furnished by this company is fully guaranteed to be strictly first class throughout, of latest designs and of strong and substantial construction in all details.

Catalogs: Catalogs concerning these turbines furnished on application.

SPECIAL HYDRAULIC MACHINERY:

This Company also builds head gate hoisting machinery, steel piping; also all kinds of power connections, shafting, gearing, pulleys, bearings, bridge-trees and many other designs of hydraulic machinery.

LEFFEL ENGINES AND BOILERS:

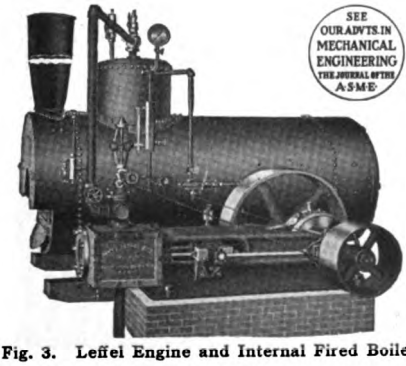


Fig. 3. Leffel Engine and Internal Fired Boiler

This Company also builds a line of Throttling and Automatic Steam Engines and Boilers, Horizontal and Vertical, from 3 H. P. up. Figure 3 shows one of the many styles. *Complete illustrated Catalog with full information on request.*

Digitized by Google

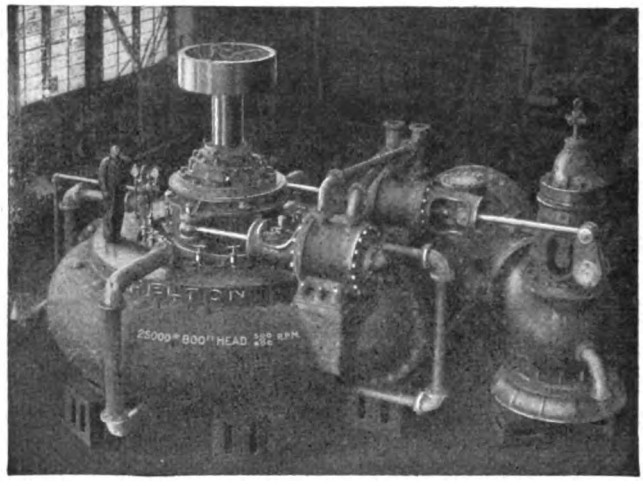
THE PELTON WATER WHEEL CO.

Hydraulic Engineers

1982 HARRISON STREET
SAN FRANCISCO, CAL.

82 WEST STREET
NEW YORK, N. Y.

Designers and Builders of Impulse and Reaction Turbines, Centrifugal Pumps and Water Wheel Governors



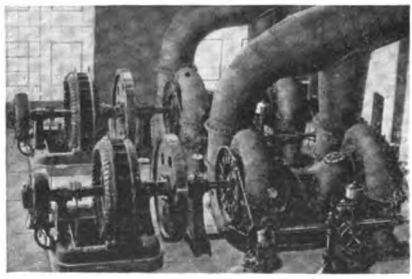
Shop Assembly of 25,000 HP, 800 ft. Head Pelton Reaction Turbine

HYDRAULIC TURBINES:

Reaction Type: Pelton Reaction Turbines are furnished in either of the general classes—vertical or horizontal—and of the particular types which will best meet the operating requirements of each individual installation.

A world's record in high head turbine design is that of two 25,000 HP Pelton Reaction Turbines under 800 ft. head, now in successful operation in the Kern River plant of the Southern California Edison Company, California.

Pelton Reaction Turbines are built in unit sizes of from 10 HP upward and for heads as low as 20 ft.



Two 1100 HP, 57 ft. Head Duplex Pelton Reaction Turbines

PELTON GOVERNORS:

The governing and controlling mechanisms of Hydraulic Turbines are vital parts of the equipment. The Pelton System of Control operating on the open sump principle and embracing individual oil pressure units, needle nozzles and direct-acting governor controlled auxiliary relief nozzles, is a guarantee of complete reliability.

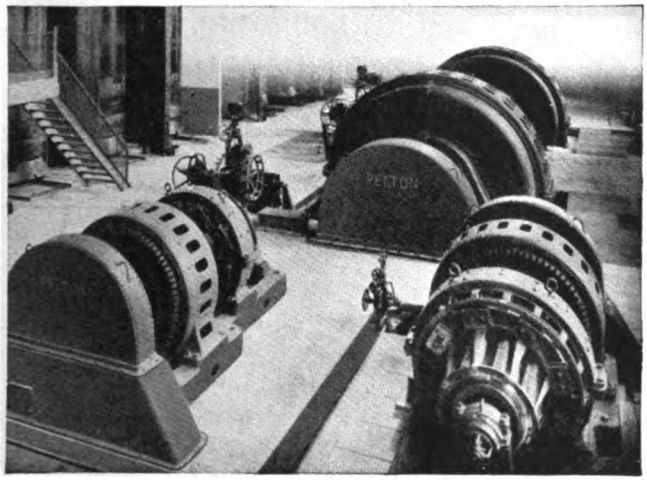


Pelton Type O-1 Oil Pressure Governor

This Company manufactures a complete line of Governors applicable to the various sizes and nature of the installation. Absolute guarantees of regulation, efficiency

Digitized by Google

THE PELTON WATER WHEEL CO. SAN FRANCISCO, CAL.

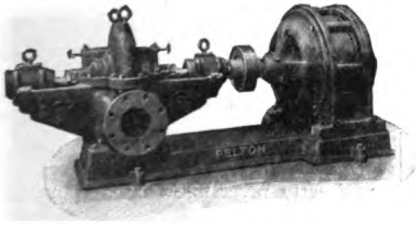


Two 20,000 HP Pelton Double-Overhung Impulse Turbines, 1400 ft. head

and quality are given with Pelton Governors and Pelton Prime Movers.

CENTRIFUGAL PUMPS:

Standard Designs: PELTON Single Stage, Single and Double Suction Pumps have been developed for use in the broad field between individual irrigation and general utility installations and those for high head and large volumes. Standardization of parts has been carried to an economical limit, but each pump is fitted with a specially designed impeller exactly suited to the conditions under which it will operate.



Standard Pelton Double Suction Single Stage Volute Pump

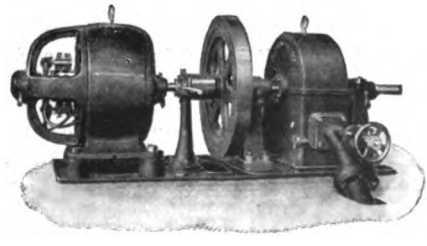
Heavy Duty Designs: Pelton Single and Multi-Stage, high efficiency Turbine Pumps are designed for Water Works, Condenser Water Circulation and heavy Irrigation Service. Direct connected prime movers will be furnished with any Pelton pump, when desired.

HYDRAULIC TURBINES:

Impulse Type: Pelton Impulse Turbines and Motors are the pioneers in the Impulse Turbine field and the name "PELTON" is recognized as the standard for impulse wheels the world over.

One of the largest single overhung impulse turbines in the world is a 15,000 HP single runner Pelton unit in the Andhra Valley Power Company's Plant, near Bombay, India.

Pelton Impulse Turbines can be furnished in any size from $^1/_{10}$ HP upward and for any head down to 30 ft.



Pelton Motor Direct-Connected to Generator, Equipped With Jaw Clutch and Flywheel Pulley

Digitized by Google

BUSCH-SULZER BROS.-DIESEL ENGINE COMPANY

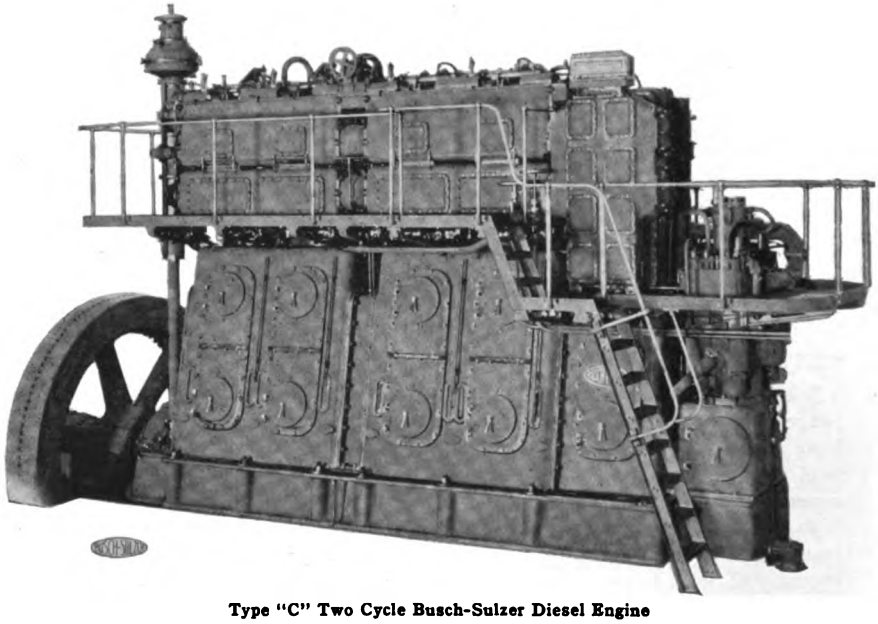
EASTERN SALES OFFICE
60 Broadway
NEW YORK

MAIN OFFICE AND WORKS
ST. LOUIS, MO.

WESTERN SALES OFFICE
Rialto Bldg.
SAN FRANCISCO

Designers and Builders of Diesel Engines since 1898

Owners of all DIESEL ENGINE Rights and Experiences, in and for the U. S. A. and its possessions, Canada and Panama, of the Diesel Motor Company of America, the American Diesel Engine Company, Sulzer Bros. (of Winterthur, Switzerland) and Rudolf Diesel (inventor of the engine).



Type "C" Two Cycle Busch-Sulzer Diesel Engine

STATIONARY ENGINES:

Vertical

Type "B" four cylinder, four cycle.

In the following standard sizes:
120, 180, 250, 365 and 520 B. H. P.

Type "C" four and six cylinder, two cycle. In sizes from 750 to 3300 B. H. P.

MARINE ENGINES:

Vertical

Type "CM" four and six cylinder, two cycle.

Directly reversible for coupling to the propeller shaft.

In sizes from 550 to 3000 S. H. P.

Special Light Weight, high-speed "Submarine" type Diesel Engines.

Digitized by Google

FULTON IRON WORKS CO.

Established 1852

HEAD OFFICE & FACTORY: ST. LOUIS, U. S. A.

BRANCH OFFICES: NEW YORK CITY AND HAVANA, CUBA

Builders of FULTON Diesel Engines

FULTON DIESEL ENGINES

Built in 4-cycle, vertical, open "A" frame type units of 3-, 4-, and 6-cylinders.

Sizes: 150–1000 B.H.P., for all power purposes, including electric light and power plants, pipe lines, water works, irrigation pumping stations, flour-, oil-, and textile mills, fill the most exacting requirements of continuous heavy duty service.

A full Diesel type heavy duty engine.

Facts on the FULTON Diesel Engine:

For all general power purposes in units from 150–1000 horsepower. A compact self-contained power plant.

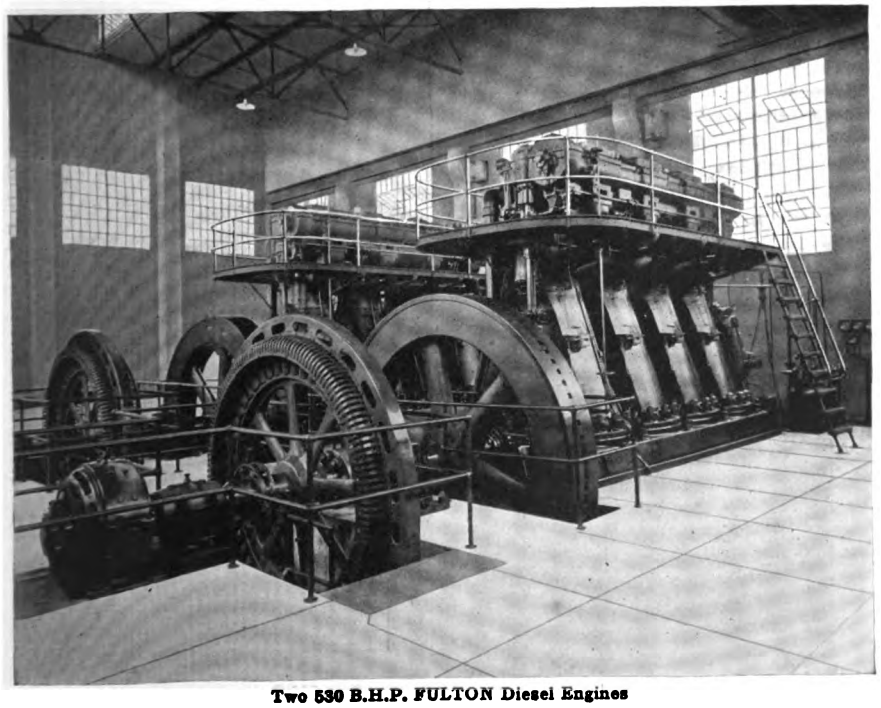
—Uses cheap fuel

—Quick and easy starting

—Economy independent of size

—No standby losses

—Long life with practically undiminished efficiency.



Two 530 B.H.P. FULTON Diesel Engines

Digitized by Google

Diesel Type Oil Engines

McINTOSH & SEYMOUR CORPORATION

MAIN OFFICE AND WORKS

AUBURN, N. Y.

149 Broadway, NEW YORK CITY | 700 Interstate Bldg., KANSAS CITY, MO. | 412 Bisbee Bldg., JACKSONVILLE, FLA | 815 Sheldon Bldg., SAN FRANCISCO, CAL



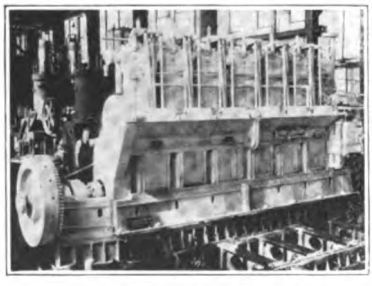
Motorship "Bramell Point"

The above Motor Tank Ship owned by the Vacuum Oil Company, is equipped with a pair of 960 I. H. P. McIntosh & Seymour Heavy Duty Diesel Type Marine Engines.

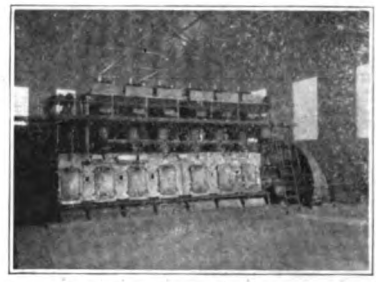
SIZES AVAILABLE

I. H. P.	R. P. M.
390	265
640	190
1200	140
1550	115
2000	105
2900	115

All four cycle and Directly Reversible.



One of the 960 I. H. P. Engines in the Motorship "Bramell Point"



Two 1000 B. H. P. Stationary Engines

The above is the Power Plant of a modern Cement Mill and contains four 1000 B. H. P. units. A fifth is now being installed.

We have engines of these types available in sizes from 100 B. H. P. to 1600 B. H. P.

Below is shown one of the most successful Municipal Lighting Stations in the country. The good service of the first unit was the reason for their ordering the second.



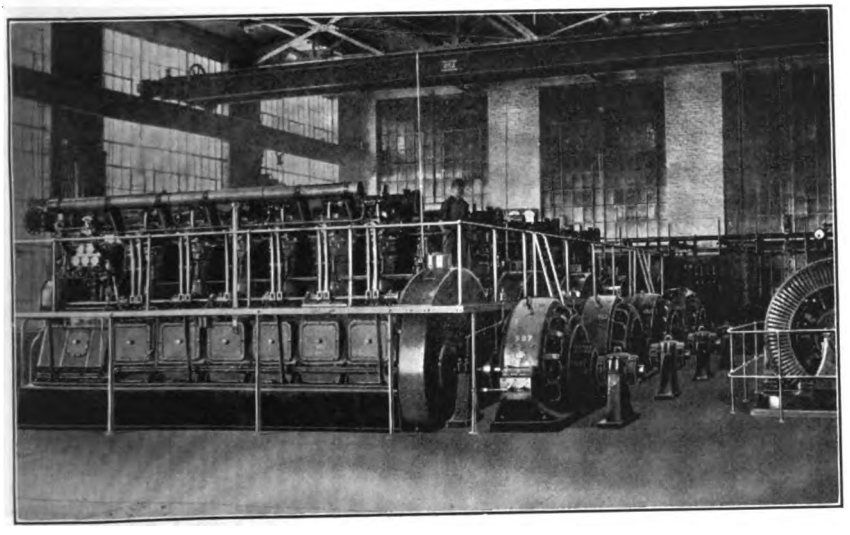
Two 500 B. H. P. Stationary Engines

Digitized by Google

NEW LONDON SHIP & ENGINE CO.

GROTON, CONN., U. S. A.

Manufacturers of Stationary and Marine Diesel Engines



Nelseco Power Plant Consisting of 4-360 B. H. P. Four-Cycle Stationary Diesel Engines

NELSECO DIESEL ENGINES:

TRADE MARK

Burn cheap crude or fuel oil. At full power the fuel consumption is very moderate, using less than one-half pound per horse-power hour.

"Nelseco" engines operate on the full Diesel principle and are ready for instant starting. No electric, hot-bulb or other ignition device is used.

They are simple in design, of rugged construction and easy to operate. Reliable service is furnished at a low upkeep cost.

Over 100,000 H. P. in Service

and

Over 50,000 H. P. Building

Or on Order.

Winner of the highest award—Gold Medal of Honor—at the Panama-Pacific Exposition.

Not only endorsed but extensively used by the United States and Foreign Governments.

Digitized by Google

DE LA VERGNE MACHINE COMPANY

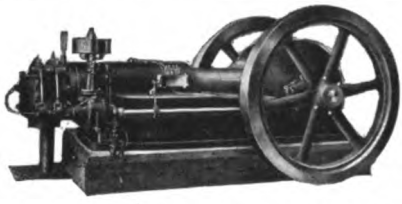
1123 East 138th St., NEW YORK CITY

Manufacturers of Oil Engines for Stationary Service
Also Refrigerating and Ice Making Machinery

Sizes range from 40 to 1080 H. P. per unit. All engines designed to operate on practically any petroleum oil obtainable in the U. S. or Mexico.

TYPE "DH:"

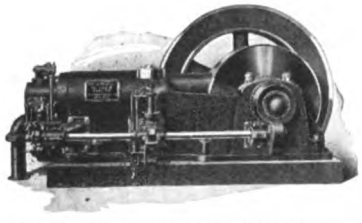
Range of sizes 40 to 130 H. P. This type is an improvement over former and



well-known Hornsby-Akroyd Oil Engine. Operates at slow speeds, on the four-stroke design; in fact, the only four-stroke cycle small Crude Oil Engine of horizontal design obtainable in this country. Engine extremely simple and reliable. Running at rated capacities requires less than .50 lb. of oil per B. H. P. hour. Logical prime mover for small Pipe Line Pumping units and auxiliaries—Municipal Power Plants and small Isolated Industrial Plants of all kinds where petroleum oil is readily procurable.

TYPE "FH:"

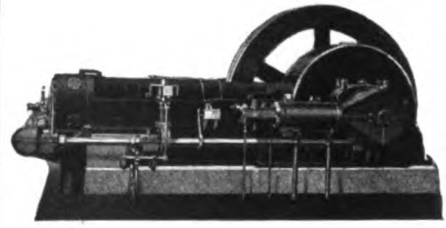
Range of sizes 100 to 280 H. P. per unit, in horizontal cylinder arrangement of one and two. Operates at low speeds. Employs medium com-



pression and functions on the four-stroke cycle. Wide and long experience of many users conclusively proves this Engine best Oil Engine for operation on Mexican or other crude oils having a high percentage asphaltic base. This is due to use of carefully designed combustion chamber, atomizer and correct compression. Engine suited for Pipe Line Pumping units, Electric Generator sets in Lighting and Power Plants, Irrigation service and Industrial drives. It is simple and extremely reliable and hence pre-eminently well suited for production of power at a low cost where petroleum oil is readily procurable. Takes less than .5 lb. per B. H. P. hour when engine is loaded near rating.

DE LA VERGNE-DIESEL:

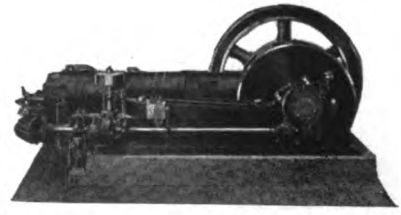
Range of sizes 180 and up in horizontal cylinder arrangements of one to six. Operates at low speeds and obtains extremely high fuel economy. Engine runs on the four-stroke cycle. This



Engine is direct result of an Oil Engine manufacturing experience of over 25 years, and as in the case of the before-mentioned Engines, particular attention has been paid in its development to such design features as lead to great simplicity of all parts. Engine extremely reliable, durable and economical. Logical prime mover for the larger Power Plants where the Oil Engine is applicable.

TYPE "SI:"

The latest development offered for stationary practice in horizontal 1 and 2 cylinder arrangements. Will operate on wide range of petroleum oils. Engine obtains Diesel economy without use of



air compressor and attendant mechanism or needle spray valve. This has eliminated many parts and furthered production of engine of maximum simplicity. All Engines, this type, may be started from stone cold and put under load in fraction of a minute. Operating at rating capacities these Engines will produce power at .45 lb. per B. H. P. hour.

SEE OUR ADVTS. IN MECHANICAL ENGINEERING THE JOURNAL OF THE A.S.M.E.

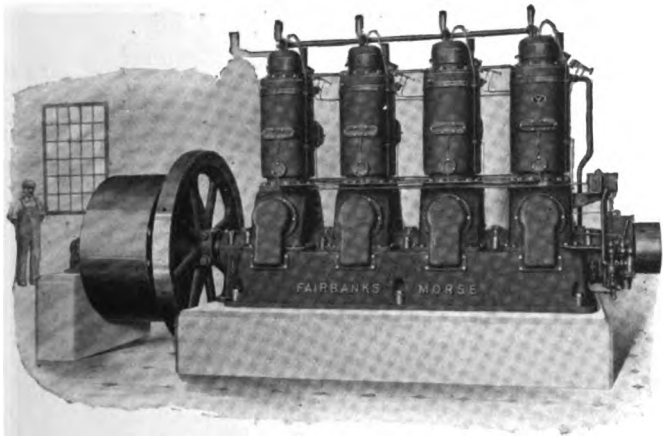
Send for Bulletins.

Digitized by Google

FAIRBANKS, MORSE & CO.

CHICAGO, ILL.

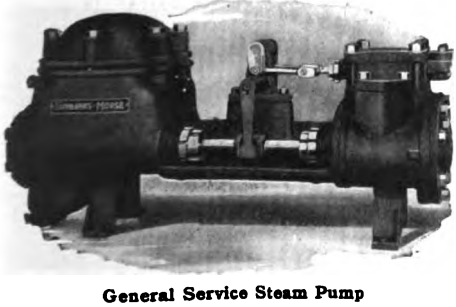
Manufacturers of Motors, Engines, Oil and Kerosene; Pumps, Steam, Power, Centrifugal; Generators, Alternators, Starters, Etc.; also Scales, All Kinds; Railway Supplies, Motor Cars, Standpipes, Coaling Stations, Etc.; Water Systems; Tanks and Towers; Hoists, Air Compressors, Etc.



200 H. P. "Y" Oil Engine

"Y" OIL ENGINES:
10 H. P. to 200 H. P.

Fairbanks-Morse "Y" Oil Engines give steady, dependable power from low-priced fuel oils. They are simple in construction—practically automatic in operation and regulation. There are no carburetors, igniters, timers, magnetos, switches or spark plugs. Special quick-starting device—engine can be put under full load in five minutes. Air seal on crank case prevents oil being blown out of bearings; positive lubrication; sensitive governor. No hot bulb or water injection into cylinders.



General Service Steam Pump

PUMPS:
Steam, Power and Centrifugal.

Fairbanks-Morse pumps are made in many types and sizes to fill practically every industrial requirement. Every pump embodies the latest refinements of design and is backed by long years of successful performance in all industries. Write for bulletin on types you are interested in.

MOTORS: A. C. AND D. C.—GENERATORS:



Fairbanks, Morse & Co. are pioneers in the manufacture of ball bearing motors. We also make sleeve and ring bearing types—A. C. and D. C., as well as alternators and generators in a wide variety of sizes.

Digitized by Google

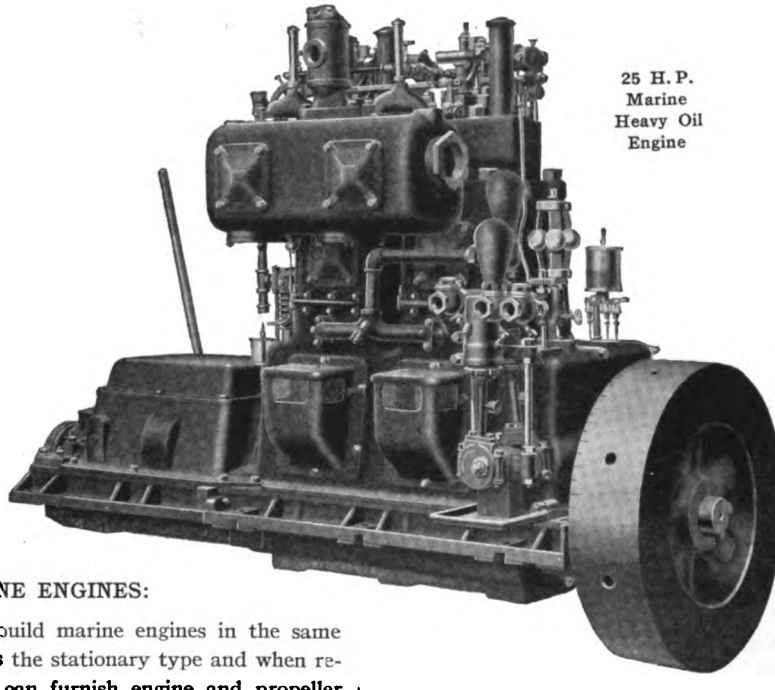
DODGE SALES & ENGINEERING CO.

HEAVY OIL ENGINE DIVISION

Distributor of the products of

DODGE MFG. CO., MISHAWAKA, INDIANA

15 Branch Warehouses in the United States **Dealers in Every Representative City**



25 H. P. Marine Heavy Oil Engine

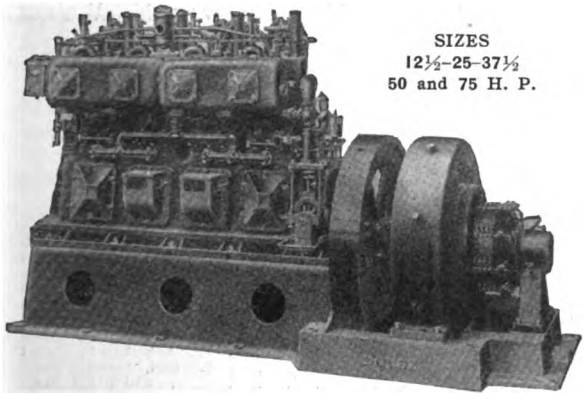
MARINE ENGINES:

We build marine engines in the same sizes as the stationary type and when required can furnish engine and propeller equipment complete for any class of heavy duty marine service, as well as auxiliary generator sets, winches, pumps, etc. Some of the outstanding characteristics of the Dodge Heavy Oil Engine which make it peculiarly adapted to marine service are reliability in starting and running, economy in fuel and operating cost ,low maintenance cost, simplicity and wide speed range. In operation, a speed range of from 180 to 450 R. P. M. enables the operator to maneuver the boat in fishing, towing or docking from the pilot house. This engine starts immediately without preliminary heating on low pressure air (No. 250). No electrical heating or igniting devices, and no torches or high pressure air supply are required.

MARINE ENGINE SPECIFICATIONS

Size	No. Cyls.	R.P.M.	Net Wt. Lbs.	Domestic Crating Weight Lbs.	Weights and Measurements Approximate Boxed for Export	
					Gross Wt. Lbs.	Cubic Measurements Cu. Ft.
12½ B. H. P.	1	425	3800	4200	4800	130
25 B. H. P.	2	425	4800	5200	5900	150
37½ B. H. P.	3	425	6200	6700	7400	175
50 B. H. P.	4	425	7400	7900	9000	200
75 B. H. P.	6	425	9700	10400	11500	250
Exhaust Silencer	..	...	500	600	700	20
Fuel Service Filter Tank	..	...	35	60	100	6

Digitized by Google



50 H. P. Stationary Engine Direct Connected to 30 K. W., 220 Volt D. C. Generator

As a reliable and economical prime mover, the Diesel heavy oil engine in the larger units has met in a satisfactory manner the requirements of a large number of users both in this country and abroad. Due to the increasing demand for engines with similar characteristics in the smaller sizes, we have developed an improvement on the Diesel principle which has enabled us to meet successfully this demand, and we are now supplying these engines to a rapidly increasing number of discriminating users who desire nothing but the best in point of reliability, service and economy of operation. These engines are manufactured with the same painstaking attention to detail which has characterized the DODGE products for over forty years, and are sold under a standard guarantee to render satisfactory service, using not to exceed .5 lb. of 28° Baumé fuel oil per B. H. P. hr. in the sizes covered under specifications below in both marine and stationary types.

The four cycle principle has been found to be the most reliable for all classes of service, and is the most widely known, and for this reason is used in all DODGE Heavy Oil Engines. Only one cylinder size (12½ B. H. P.) is used and the larger engines are built in multiples of this size cylinder. The greater number of parts used in these engines are therefore interchangeable, and standard to all sizes. We are prepared to furnish complete power plants under one contract within the range of sizes given, either direct connected or belt driven, for almost every class of stationary or marine requirements, and to furnish reliable experienced engineering service to any one contemplating the installation of internal combustion engines.

STATIONARY ENGINE SPECIFICATIONS

Size	No. Cyls.	R. P. M.	Net Wt. Lbs.	Domestic Crating Shipping Weight Lbs.	Approximate Weights and Measurements Boxed for Export	
					Gross Wt. Lbs.	Cubic Measurements Cu. Ft.
12½ B. H. P.	1	425	3000	3400	3900	90
25 B. H. P.	2	425	4000	4400	5000	110
37½ B. H. P.	3	425	5100	5600	6200	130
50 B. H. P.	4	425	6200	6700	7500	150
75 B. H. P.	6	425	8400	9100	10000	190
Exhaust Silencer	..	....	500	600	700	20
Fuel Service Filter Tank	..	....	35	35	100	6

(See pages 326–329, incl., for additional products of this Company)

Digitized by Google

WORTHINGTON PUMP AND MACHINERY CORPORATION

EXECUTIVE OFFICES: 115 BROADWAY, NEW YORK

WORKS

Worthington Works, Harrison, N. J.
Blake & Knowles Works, East Cambridge, Mass.
Deane Works, Holyoke, Mass.
Power & Mining Machinery Works, Cudahy, Wis.
Laidlaw Works, Cincinnati, Ohio
Snow-Holly Works, Buffalo, N. Y.
Hazleton Works, Hazleton, Pa.
Gas Engine Works, Cudahy, Wis.
Epping-Carpenter Works, Pittsburgh, Pa.

BRANCH OFFICES

Atlanta, Ga.	435 Trust Co. of Georgia Bldg.
Birmingham, Ala.	Amer. Trust & Savings Bk. Bldg.
Boston, Mass. 2	465 Massachusetts Trust Bldg.
Buffalo, N. Y.	707 Iroquois Bldg.
Chicago, Ill.	820 Old Colony Bldg.
Cincinnati, Ohio	1503 First National Bank Bldg.
Cleveland, Ohio	304 Kirby Bldg.
Denver, Colo.	435 Seventeenth Street
Detroit, Mich.	398 Majestic Bldg.
El Paso, Texas	510 Mills Bldg.
Houston, Texas	423 Southern Pacific Bldg.
Kansas City, Mo.	825 Scarritt Bldg.
Los Angeles, Cal.	209–210 Higgins Bldg.
Mexico City, Mexico	P. O. Box 5260
New Orleans, La.	533 Baronne Street
Philadelphia, Pa.	1516 North American Bldg.
Pittsburgh, Pa.	407 Oliver Bldg.
St. Louis, Mo.	701 Laclede Gas Bldg.
St. Paul, Minn.	1017 Commerce Bldg.
Salt Lake City, Utah	318 Felt Bldg.
San Francisco, Cal.	306 Sharon Bldg.
Seattle, Wash.	203 Maynard Bldg.
Tulsa, Okla.	123 West First Street
Washington, D. C.	426 Homer Bldg.
London, England	Queen's House, Kingsway

Paris, France, Societe Francaise des Pompes et Machines Worthington, 1 Ruedes Italiens

PRODUCTS:

Pumps and Pumping Equipment: All types for every conceivable service, including Steam Pumps; Steam, Oil Engine; Gas Engine, Belt, Motor and Turbine Driven Centrifugal Pumps. High Economy Pumping Engines of every type (flywheel, centrifugal or direct acting) for water works, sewage, irrigation or other service requiring the economical pumping of large quantities of water by steam, electricity, gas or oil.

Condensers: Surface, Jet, Barometric and Ejector.

Feed Water Heaters.

Meters: Water, Oil and Gasoline.

Compressors: Air, Gas and Ammonia.

Vacuum Pumps.

Engines: Oil, Kerosene, Diesel and Gas.

Hydraulic Turbines and Water Wheels.

Filter and Tankage Presses.

Mining and Cement Machinery: Gyratory and Jaw Crushers; Ball, Tube, Rod and Stamp Mills; Rolls; Jigs; Screens; Log Washers; Elevators and Conveyors; Converters and Blast Furnaces.

Also Sand Riddlers, Core Wire Straighteners, Oil Mill Machinery, Oil Burner Pumping Units and Locomotive Feed Water Heaters.

WORTHINGTON DUPLEX PACKED PISTON PUMPS:



Standard for all ordinary services where the water pressures are not in excess of 200 lbs. per sq. in.

For boiler feeding, tank supply, hydraulic elevators, small water works service and general water supply purposes. Accessible in every part, and fitted for pumping hot or cold, thick or thin, heavy or light, acid or alkaline liquids as may be required. Where high steam economy is of paramount importance, they are supplied with compound steam cylinders.

Digitized by Google

WORTHINGTON PUMP AND MACHINERY CORPORATION
NEW YORK, N. Y.

OUTSIDE PACKED PLUNGER PUMPS:

Designed for rough and heavy service for working pressures of 140 to 250 lbs. per sq. in.

They are completely accessible and can be furnished to handle up to 5650 gals. per minute.

POT VALVE PRESSURE PUMPS:



For high pressure boiler feeding and services requiring high water pressure, up to 2000 lbs. per sq. in., suitable for steel and rolling mills in connection with hydraulic presses and for high-lift elevator work.

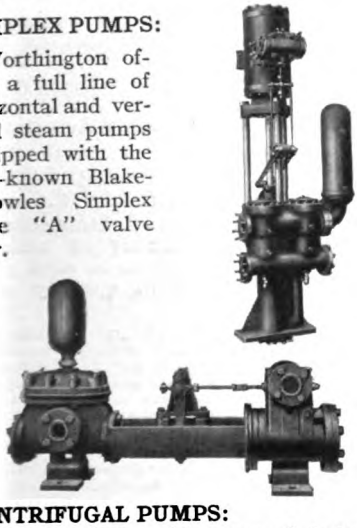
Where economy is important, compound steam cylinders are employed.

Worthington builds a forged water end pump for pressures from 2000 to 12,000 lbs. per sq. in.

Special pumps available for any service.

SIMPLEX PUMPS:

Worthington offers a full line of horizontal and vertical steam pumps equipped with the well-known Blake-Knowles Simplex style "A" valve gear.



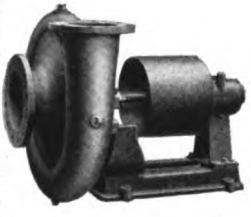
CENTRIFUGAL PUMPS:

Because of the wide range of designs, Worthington is enabled to meet the preference of any customer and to furnish a pump best suited for his conditions of service. Following are indicated a few of the main types of volute pumps, the line of which runs from the 1-in. Class "C" volute to the 72-in. double suction volute.

These pumps may be used for a variety of purposes; for waterworks service; sewage pumping plants; dry dock pumps; irrigation and drainage service; circulating water for condensers; paper mills; sugar factories; pumping brine, light oils, mine water, acidulous water, slimes, etc.

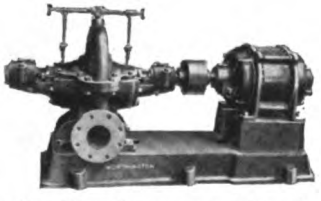
They can be arranged for direct drive from steam turbines and engines, oil engines and electric motors, also for belt drive.

CLASS "C" VOLUTE PUMPS:



For all around service where small and medium quantities of water are to be pumped against heads not exceeding 80 ft. Handle gritty and sandy water, and are especially adapted for building contractors' work, also in connection with water supply from driven wells. These are standard pumps all for temporary and intermittent service, as first cost of installation will be lower than with any other pumping outfit.

TYPE "OS" VOLUTE PUMPS:



For handling large quantities of water at maximum efficiency where head does not exceed 100 ft. Any tendency to end thrust has been eliminated by making impeller of double suction type. Horizontally split casing permits of ready inspection of internal parts. This type is designed for electric motor, steam turbine, or belt drive.

TYPE "BS" VOLUTE PUMPS:

Similar to Type "OS" but for more severe service and for heads up to 200 ft. In addition to the double suction type of impeller, a special by-pass connecting the pressure chambers is provided, thereby insuring absolute hydraulic balance when working against high pressures.

(Continued on next pages)

Digitized by Google

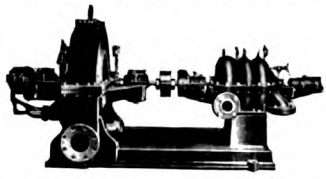
(Continued from preceding pages)

WORTHINGTON PUMP AND MACHINERY CORPORATION
NEW YORK, N. Y.

CLASS "SD" VOLUTE PUMPS:

For regular all around factory and industrial high pressure service. Built in 2 stages for heads up to 360 ft. and in 4 stages for heads up to 720 ft. Impellers placed back to back in order to hydraulically balance end thrust. Bearings are of dustproof, ring oiled removable shell type. The smaller number of parts makes the "SD" pump especially desirable where water contains sand or grit. This type has been approved by the National Board of Fire Underwriters and can be furnished equipped with all necessary fittings for fire service.

MULTISTAGE CENTRIFUGAL PUMPS:



For service in connection with water works, hydraulic elevators, mine drainage, boiler feeding, high pressure fire service, house service, etc.

The single suction turbine type in 2, 3 and 4 stages will deliver against a head of 180 ft. per stage.

The double suction turbine type, built in 1, 2, 3 and 4 stages, is especially recommended for boiler feeding on direct turbine drive and for all heads over 160 ft. or 70 lbs. Its design automatically assures perfect hydraulic balance and freedom from end thrust. Sizes range from 4- to 10-in. capacities up to 3500 gals. per minute.

Other types of multistage centrifugal pumps are stocked to meet the conditions of any pumping service.

POWER PUMPS:

Power pumps of every type in a complete range of sizes are built at the Deane Works for every variety of purpose. The designs are such that maximum strength, rigidity, durability and efficiency are obtained with minimum wear.

CONDENSING EQUIPMENT:

Worthington can furnish steam condensing apparatus to meet the requirements of any set of operating conditions that may exist. The line includes every type of jet condensing equipment, spiro-



jector, ejector and barometric types as well as surface condensers from the very smallest sizes to the largest units built in the United States.

Being pump manufacturers on such a large scale enables Worthington to supply auxiliaries best suited to the needs of the particular condenser selected.

FEED WATER HEATERS:

Worthington, Stilwell type feed water heaters are built in several types and sizes up to 1000 h.p. for use with engines or pumps exhausting free to the atmosphere, and up to 20,000 h.p. for condensing plants. This heater combines in one unit a feed water heater, a feed water purifier, a condensation and a feed water softener.

Worthington also builds Locomotive Feed Water Heaters.

METERS FOR HOT AND COLD WATER, GASOLINE, OIL, ETC.:

The Worthington line of meters permits the selection from among its various types and sizes of a meter to meet particular conditions as to quantity and rate of flow.

Model "G" Flat Disc Meter: Embodies in one meter: full size disc and measuring chamber; largest capacity of any meter; low frictional resistance; fewest individual parts; low weight; extreme accuracy; insurance against chemical troubles and freezing, and an intermediate train which will outwear any other form or make of train gearing hitherto manufactured.

Turbine Meters: Designed primarily to handle large volumes of water with minimum loss of pressure.

Compound Meters: Combine the characteristics and capacities of the disc and turbine meters in that they will register over a wider range of flows than either of the above types, and are, therefore, especially adapted where the flow of water is subject to considerable variation.

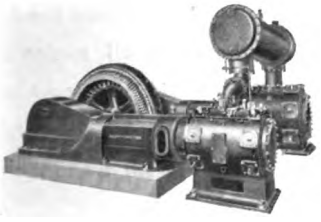
Duplex Piston Meters: For measuring crude oil, petroleum, etc., and recording amount used in connection with oil burning apparatus.

Hot Water Meters: For boiler testing and boiler feed lines are made in a variety of types and sizes.

Digitized by Google

WORTHINGTON PUMP AND MACHINERY CORPORATION
NEW YORK, N. Y.

AIR, GAS AND AMMONIA "FEATHER" (Reg. U. S. Pat. Off.) VALVE AIR COMPRESSORS:



Worthington carries in stock a full line of sizes and types of "Feather" valve compressors from the small vertical belt driven compressor suitable for the shop requiring small quantities of air to the large duplex 2-stage direct motor or steam driven units.

All compressors are equipped with "Feather" (Reg. U. S. Pat. Off.) valves, unquestionably the most efficient and durable valves yet designed for compressor service. These extremely simple valves insure efficient, quiet and safe operation at high rotative speeds, minimum air friction, low maintenance cost and ease of access.

VACUUM PUMPS:

Equipped with the same valves that have made Worthington air compressors so universally successful. Carried in stock in many sizes, arranged for belt, steam and direct drives.

KEROSENE ENGINES:

For general service, electric storage battery work, factories, foundries, feed mills, elevator shops and farms.

Sizes, 1½, 2½, 4, 6, 8, 10, 15, 20 and 25 h.p. The 20- and 25-h.p. engines are cooled by running water or thermosyphon cooling tank; other sizes are hopper cooled.

All sizes equipped with throttling governor.

DIESEL ENGINES:



The Worthington line of Diesel engines runs from the vertical 2 cycle, solid injection type built in 1, 2 and 3 cylinders from 25 to 240 h.p. to the 2400 h.p. vertical air injection Diesel and includes the "Snow" horizontal 4 cycle air injection Diesel engine built in sizes up to 600 h.p.

These engines operate on the cheapest grades of oil fuel and show economies that greatly exceed those obtained by any other type of prime mover.

HYDRAULIC TURBINES AND WATER WHEELS:

For utilizing to the fullest the potential power in any available water shed, Worthington manufactures hydraulic turbines of the well-known Francis reaction type. The line includes vertical and horizontal standard wheels of the open flume as well as enclosed casing type.

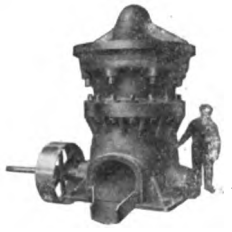
FILTER PRESSES:

Are manufactured in two types and several capacities. The Smith-Vaile vertical and horizontal styles are designed for oil mills and chemical plants where the demand is for a press of medium capacity.

The fields of application for the Worthington filter press are practically unlimited. A few of the more prominent uses are for sugar factories, both cane and beet; packing houses, for edible and inedible beef and hog tankage; oleomargarine, blood, etc.; mining industries for the treatment of slimes; sewage and sludge disposal plants, and a great variety of uses in the chemical industry.

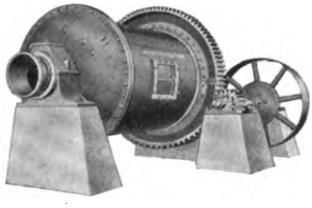
MINING AND CEMENT MACHINERY:

Jaw Crushers: Superior type, made in sizes from 7 by 10 to 84 by 66 in., with either cast steel or semi-steel frame reinforced with forged steel rods.



Gyratory Crushers: Made in superior McCully (patented) type with feed openings from 8 to 72 in. Lubrication is force feed to eccentric bearing and gearing. Capacities, 4½ to 1500 tons per hour, depending on size of crusher and ring size of material.

Standard McCully gyratory crusher made in sizes from No. 1 to No. 11, inclusive.



Cylindrical Mills: Worthington makes ball mills in all diameters and lengths, with any type of lining or drive, tube mills of the same characteristics, and rod mills in diameters and lengths to suit conditions.

Rolls: Made in Garfield, Superior and Simplex types in diameters from 12 to 78 in., with various widths of face, according to conditions, and with pulleys either of the flywheel or standard type.

Jigs: Of the Woodbury type with iron hutches, with any desired number of compartments. Also a full line of Hartz jigs, with either wood or iron hutches.

Other Equipment: In addition to the above line, Worthington makes a large line of screens both for dry and wet screening; stamp mills; sampling devices; log washers; upright, horizontal and Pierce-Smith type converters together with a complete line of converter accessories such as slag cars, matte and slag ladles, ladle bails, pots, straight line casting machines, round or rectangular water jacketed blast furnaces for either silver, lead or copper.

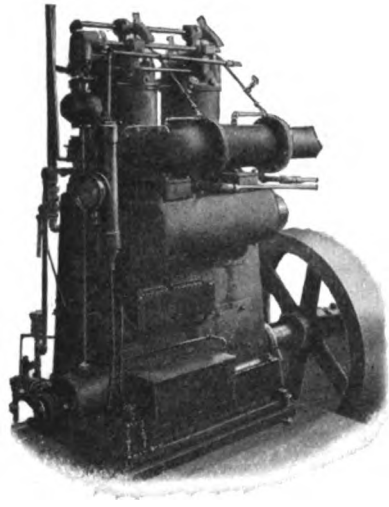
Digitized by Google

THE TAYLOR MACHINE COMPANY

310 SOUTH WABASH AVE., CHICAGO, ILLINOIS

Manufacturers of Stationary and Marine Oil Engines

"TAYLOR PRINCIPLE" OIL ENGINES:
An Idea materialized



All Sizes 5 H.P. to 6000 B.H.P.

Industrial progress demands efficient, reliable and economical Power.

Power is the heart of everything that moves. Then, it is evident that business requires the best Power that modern engineering can devise.

There is a factor that quickly determines the adaptability of a given Power. This factor is the Public, the Common Power user. Thus, the success of an engine going into the hands of the Public, is in exact proportion as that engine can be understood and successfully operated by the Layman.

It is to be desired by everyone interested in Power to learn how the idea that materialized supplies oil engine power in a systematic, efficient manner with the same degree of flexibility and reliability as a steam engine. All of the complicated parts are now made unnecessary.

It will start under load. The horse power of the engine doubles for emergency when desired. It starts from stone cold to full power in ten seconds, and is direct reversible. The range of variable speed for cruising is from 25% to full speed.

This engine produces 20 B.H.P. per gallon from all fuels or crude oils, operating on the cheapest fuels of 10 degree Baumé or lighter, and it makes no difference if the fuels are *very dirty* when atomized by the Taylor Perfect Fuel Control and Automatic Self Cleaning Atomizer. This is the reason why "Taylor Principle" Oil Engines are the simplest and most satisfactory oil engines. These accomplishments make a significant contribution which has elevated the Oil Engine Industry.

A complete line of sizes from 5 to 6000 B.H.P.—in heavy duty types and high speed types for Stationary and Marine —is contained in the book, telling the story of "an idea materialized."

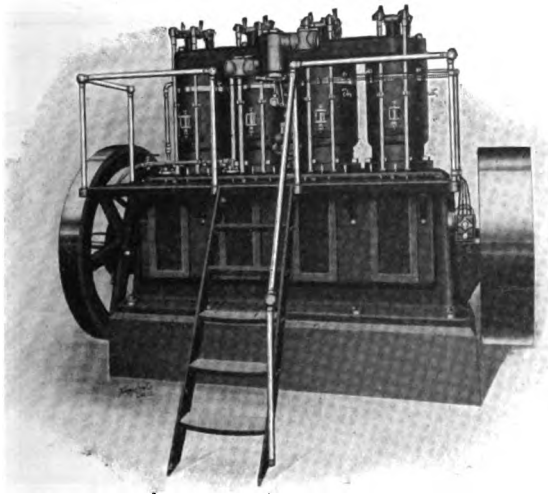
Digitized by Google

HOPE ENGINEERING & SUPPLY CO.

MT. VERNON, OHIO

TULSA, OKLA. PITTSBURGH, PA.

Consulting and Contracting Engineers in Natural Gas and Petroleum
Laboratory and Field Tests—Reports



BUILDERS OF REEVES VERTICAL GAS ENGINES:

Any Power up to 300 H. P., Natural, Artificial and Producer Gas.

REEVES AIR, GAS AND AMMONIA COMPRESSORS:

Strip Steel Valve construction for high speeds.

Manufacturers of:

HAMMON PIPE COUPLER for Oil, Natural Gas and Water Lines in any Service.

HEAT EXCHANGERS for Treatment of Oil and Gas in Refineries, By-Product Coke Plants, Etc.

ABSORBERS for Gasoline Absorption Plants, Chemical Works, Etc.

Correspondence Solicited

DATA ON REEVES VERTICAL GAS ENGINES

H. P. Nat. Gas	Cylinder			R. P. M.	Shipping Weight	Floor Space	Standard Pulley
	No.	Div.	Stroke				
18	1	9½	11½	300	5800	48x54	
40	2	9½	11	300	9000	72x58	24x 8
60	3	9½	11	300	12500	88x58	30x10
80	4	9½	11	800	17000	104x58	36x12
100	3	11½	13	275	20000	106x76	36x14
125	4	11½	13	275	26000	126x76	54x14
150	4	12¼	13	275	28000	128x16	54x19
170	4	12½	14	275	36000	144x80	
200	4	14	14	275	40000	148x80	Special
300	6	14	14	275	50000	200x80	"

Prices Furnished on Application.

Digitized by Google

A. E. OLMSTEAD & SONS

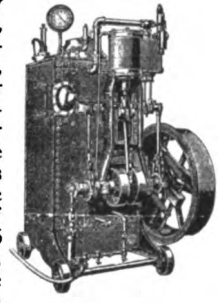
ONTARIO IRON WORKS

PULASKI, N. Y.

Manufacturers of The Safe Steam Engine & Water Tube Boiler
Also Ontario Gasoline Motors

THE SAFE STEAM ENGINES AND BOILERS are automatic in every way possible, and have made their own introduction during the last twenty-five years by being the most economical power and steamer known, and being so compact they are adapted to all kinds of situations where room is limited. There are no conditions, outside or inside, to which their application is not perfect.

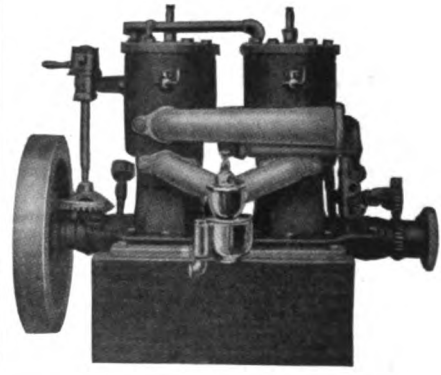
In this rig you have one that will burn any kind of fuel, and will make all the steam required for heating, power purposes, creamery and dairy work, sterilizing, cooking, laundry work, etc. The boiler and engine is furnished complete, or the boiler alone where no engine is required. The water capacity of the boiler is 15 quarts per H. P., and as they are equipped with automatic water feed, the water is constantly fed to the full requirements of the boiler. There is no trouble in making steam in ten minutes from cold water. The boilers are tested at 150 lbs. cold water pressure, and are subjected to 125 lbs. steam pressure. Each one has twelve square feet heating surface per H. P.



The boiler is air spaced and furnished with dumping grates for either coal or wood, and has automatic damper regulator. The great economy of this boiler is in the use of fuel, quick steamer, and the little room it occupies. They are built in sizes, 3, 4, 5, 6, 8, 10, 12 and 15 H. P. For house heating they are equipped with low pressure fittings.

The engines are double valve, the cut-off valve being operated by the automatic governor in the fly-wheel, and are set to run from 250 to 325 revolutions per minute. The pistons are fitted with expansion ring breaking joints on one-third of the circle of the cylinder.

ONTARIO GASOLINE MOTORS:



THE ONTARIO line of motors consists of the following line of two-cycle, three-port, valveless sizes:

Horse Power	Cylinders	Bore	Stroke
2	single	2⅝″	3″
3	single	3½″	3½″
6	two	3½″	3½″
9	three	3½″	3½″
12	four	3½″	3½″
7	single	5″	5″
14	two	5″	5″
21	three	5″	5″
28	four	5″	5″

These motors are free from all complicated mechanism and are remarkably free from vibration, owing to their correct design and construction. The center of gravity is extremely low, and the flanges by which the motor is secured to its foundation, are in line with the center of the crank shaft. These motors are equipped with either jump spark and timer or with high tension magneto.

The 2 H. P. single cylinder motor is especially constructed for direct connecting to centrifugal pumps. Valve trouble has been eliminated by doing away with all valves.

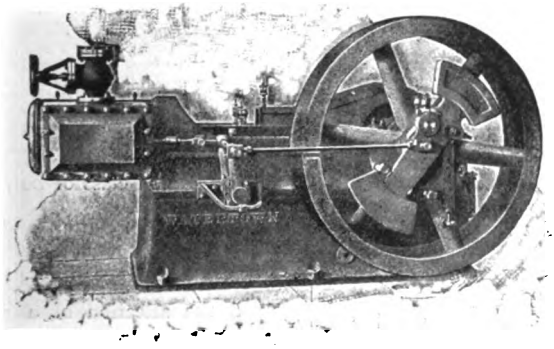
Catalog in English or Spanish.

Digitized by Google

WATERTOWN ENGINE AND MACHINE CO.

WATERTOWN, N. Y.

Machinists and Engineers—Engine and Boiler Repairs, Machinery Guard Building



ENGINE REPAIRS:

We have portable tools and competent mechanics whose life work has been engine building and repairing.

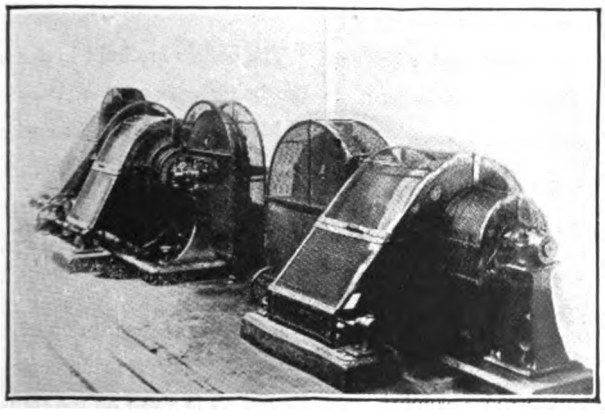
We make a specialty of furnishing replacements and repairs for Watertown engines and boilers.

We indicate and regulate engines.

MACHINERY GUARDS:

Our machinery guards are practical, substantial and pleasing to the eye. Where a variety of machines are to be guarded we have been able to effect a substantial saving by building the guards at the customer's plant.

We solicit inquiries and shall be pleased to furnish names of satisfied customers.



Digitized by Google

THE BABCOCK & WILCOX CO.

GENERAL OFFICES:

85 LIBERTY STREET, NEW YORK

Water Tube Steam Boilers, Steam Superheaters, Mechanical Stokers

BOSTON, 49 Federal St.
PHILADELPHIA, North American Bldg.
PITTSBURGH, Farmers Deposit Bank Bldg.
CLEVELAND, Guardian Bldg.
CINCINNATI, Traction Bldg.
ATLANTA, Candler Bldg.
NEW ORLEANS, 521-5 Baronne St.
HOUSTON, TEX., Southern Pacific Bldg.
FORT WORTH, TEX., Flat Iron Bldg.
TUCSON, ARIZ., 21 So. Stone Ave.
CHICAGO, Marquette Bldg.
DETROIT, Ford Bldg.
DENVER, 435 Seventeenth St.
SALT LAKE CITY, 705-6 Kearns Bldg.
SEATTLE, L. C. Smith Bldg.
SAN FRANCISCO, Sheldon Bldg.
LOS ANGELES, Central Building
HONOLULU, H. T., Castle and Cooke Bldg.
HAVANA, CUBA, Calle de Aguiar 104
SAN JUAN, PORTO RICO, Royal Bank Bldg.

WATER TUBE STEAM BOILERS:

Babcock & Wilcox

Babcock & Wilcox Marine

Babcock & Wilcox Express

Stirling

Rust

Boiler practice has changed materially in the past ten years. Higher pressures and higher superheat have come into every-day practice and with these changes have also come larger units and higher rates of combustion, due to better stokers and furnace arrangement, better methods of feed water treatment, improved coal and ash handling apparatus and a better understanding of the care and operation of boilers. During this period great improvements have been made in the utilization of other fuels than coal. These developments have brought about a change in boiler room design and necessitate a much more careful study of the size of plant, service conditions, fuel, water, and class of boiler room help available.

By reason of the different factors involved the selection of a proper boiler unit is much more complex than in the past. Years ago this Company manufactured a line of so-called "standard" boilers; while these standards are still in existence, the sale of a standard boiler today is a rarity, for the reason that operating conditions cannot be even approximately standardized. Each and every prospective boiler sale is approached by this Company as an entirely new and independent engineering problem, the various factors involved determining the particular type, size and setting of boiler offered.

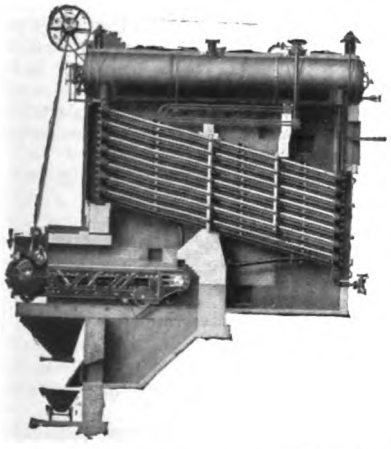
The boilers are built in accordance with the boiler code of the American Society of Mechanical Engineers and a certificate of shop inspection by the Hartford Steam Boiler Inspection and Insurance Co. or other qualified inspection company will be furnished.

A very brief description of the different types of boilers manufactured by this Company is given on the following pages.

Digitized by Google

THE BABCOCK & WILCOX CO. NEW YORK, N. Y.

THE BABCOCK & WILCOX BOILER:



The heating surface of the boiler is made up of drums extending longitudinally over the other pressure parts. To the drums there are connected, through forged-steel cross boxes at either end, the sections made up of headers and tubes. At the lower end of the sections there is a mud drum extending entirely across the boiler and connected to all of the sections. The connections between all parts are made by short lengths of tubes expanded into bored seats.

The headers into which the tubes are expanded are of forged steel and are of serpentine or sinuous form so that the tubes are disposed in a staggered position when assembled as a complete boiler. This staggering of the tubes breaks up the gases and causes them to impinge on every tube.

Opposite each tube end in the headers there is placed a handhole of sufficient size to permit the inspection, cleaning or renewal of a tube. These handholes are closed by suitable handhole fittings.

The gases of combustion are caused to make three passes over the heating surfaces by baffles constructed of special baffle brick and cast-iron flame plates.

The form of the furnace is such that it is readily adaptable to the fuel available, whether solid, liquid or gaseous.

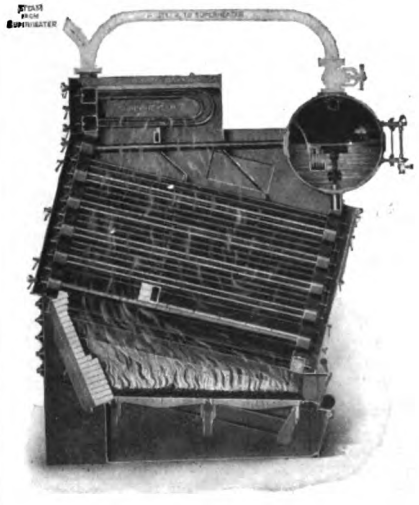
Boilers are suspended front and rear from wrought-steel supporting frames, entirely independent of the brickwork.

Patented dusting doors furnish a means of keeping all portions of the heating surfaces free from soot and dust. Large doors in the sides of the setting give full access to all parts for inspection and for the removal of any accumulation of soot.

THE BABCOCK & WILCOX MARINE BOILER:

The Marine Type of Babcock & Wilcox boiler preserves the excellent features of the Land Type but adapts them to the conditions on shipboard. The tubes are usually of smaller diameter and are shorter than in the Land Type. The furnace increases in volume toward its exit and with its tile roof gives highly efficient combustion. The flame plates or baffles and the staggering of the tubes give the heating surface an efficiency unobtainable in any other boiler.

All parts subject to pressure are made of the highest quality of forged steel. No castings are used. The parts are as thick or thicker than the corresponding parts in cylindrical or Scotch boilers. The weight of the boiler, however, is less than one-half that of Scotch marine boilers for pressures above 200 pounds. There are Babcock & Wilcox marine boilers which have



been in service for more than fifteen years which are still using the original tubes.

The Babcock & Wilcox marine boiler is especially adapted to the use of oil fuel. Where oil is burned, practically the entire surface of the furnace is composed of firebrick, insuring perfect combustion.

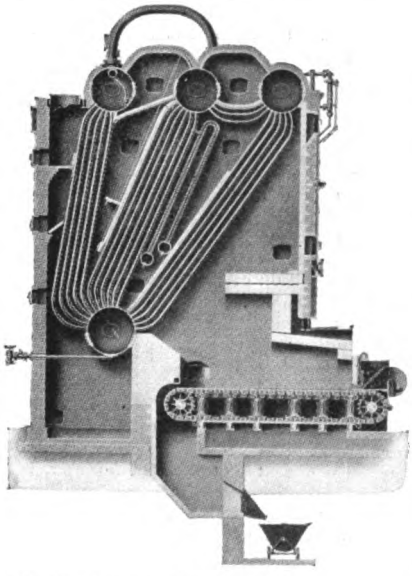
(Continued on next pages)

Digitized by Google

(Continued from preceding pages)

THE BABCOCK & WILCOX CO. NEW YORK, N. Y.

THE STIRLING BOILER:



The Stirling boiler consists of three transverse steam and water drums set parallel and connected to a mud drum by three banks of water tubes so curved as to enter the drums radially. The center drum is connected to the front and rear drums by steam circulating tubes and to the front drum by water circulating tubes. Steam is taken from the rear drum.

The tubes are so spaced as to allow the removal of any tube without disturbing any other tube or the brickwork.

The furnace is formed by the use of a firebrick arch sprung across the boiler setting in the triangular space formed by the front wall and the front bank of tubes. This furnace readily lends itself to the installation of any stoker and the burning of any class of fuel.

The gases of combustion are led from the furnace over the heating surface by two baffles of firebrick tile, one resting on the rear row of tubes of the front bank and the other supported on the rear row of tubes of the second bank.

The boiler is supported on a wrought steel framework entirely independent of the brickwork setting.

Large cleaning doors in the sides of the setting give ready access to all portions for cleaning, inspection and repair.

THE RUST BOILER:

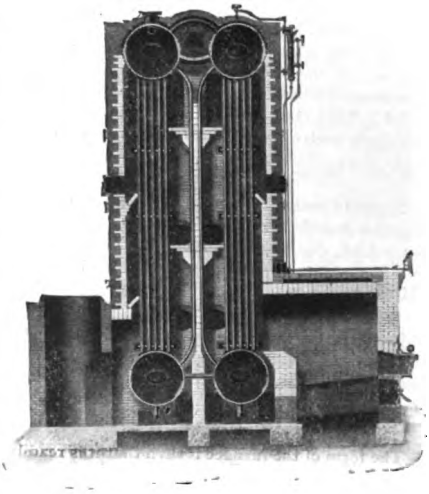
The Rust boiler is made up of two transverse steam and water drums and two transverse mud drums connected by banks of tubes. Each steam drum is connected to the mud drum directly below it by five rows of straight tubes and one row of curved tubes. The steam drums are connected by curved steam and water circulating tubes and the mud drums by water circulating tubes.

The tube sheets of all drums are pressed to form individual tube seats, thus permitting straight tubes to be expanded directly into the cylindrical drums. This construction is patented.

The tubes are staggered and are so arranged that any tube may be removed without disturbing any other tube or the boiler brickwork.

The furnace is of the extension or Dutch oven type and, being distinct from the boiler setting proper, enables any type of stoker or any fuel to be used.

The gases are caused to make two passes over the heating surface by a vertical firebrick baffle built between and held in position by the central curved tubes. Horizontal baffle shelves cause all portions of the heating surface to be swept by the gases.



The boiler is supported entirely free of the brickwork on cast-iron saddles under the mud drums, the saddles resting on masonry foundations.

Digitized by Google

THE BABCOCK & WILCOX CO. NEW YORK, N. Y.

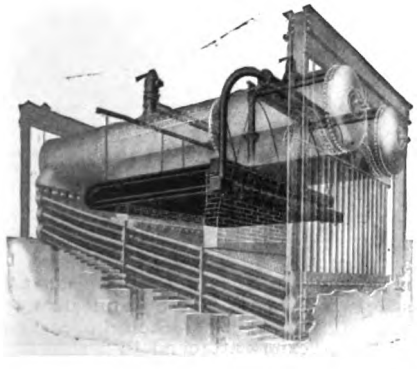
THE BABCOCK & WILCOX STEAM SUPERHEATER:

The Babcock & Wilcox superheaters, as built for installation in all boilers of The Babcock & Wilcox Co.'s manufacture, are similar in design, location and operation. The construction is modified in certain details to meet the specific requirements of individual boilers.

The superheater consists of two headers or manifolds, into which tubes bent to a U-shape are expanded. These headers are equipped with handholes and forged-steel handhole fittings, giving access to each tube end. As there is no rigid connection between the headers and because of the proper methods of suspensions, there can be no strains set up in the apparatus by contraction or expansion. Each superheater is equipped with an independent steel-bodied, outside-spring, safety valve.

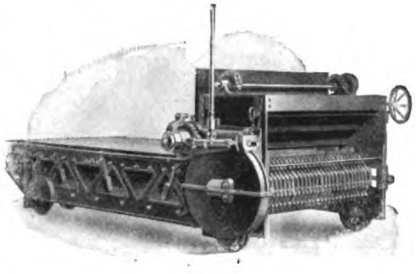
The superheater in all cases is located in the direct path of the products of combustion. The surfaces presented to these gases are smooth, offer the minimum resistance to the passage of the gases and the least opportunity for the adhesion of dust.

Steam is taken from the steam space of the boiler through the dry pipe, is introduced into the intake header and passes through the superheater tubes to the outlet header, to which the superheated steam connection from the boiler is made.



THE BABCOCK & WILCOX CHAIN GRATE STOKER:

The Babcock & Wilcox chain grate stoker consists of a grate in the form of an endless chain passing at the front and rear of the boiler furnace over sprockets which are keyed to shafts carried by the stoker frame. The passage of the grate through the furnace is continuous. The stoker is driven through a worm wheel keyed to the front sprocket shaft. The fuel is fed uniformly to the front end of the grate under an adjustable stoker gate. The volatile gases are driven off on the forward portion of the grate under an ignition arch and are completely consumed in passing over the incandescent fuel bed before striking the boiler heating surface. Combustion is truly progressive. The ash and refuse are discharged automatically and continuously as the grate turns over the rear sprockets.



The form of the grate links is such as to allow proper admission of air for combustion. Suitable side seals and a bridge wall water box prevent the admission of large quantities of excess air. The bridge wall water box is connected into the water circulation of the boiler and is part of the regular stoker equipment.

The construction of the entire stoker is of such rugged character throughout as to permit continuous operation without the necessity of shutdowns for repair.

This stoker will only be offered for installation where fuel suitable for chain grate stokers is available.

Over 25,000,000 horse power of boilers manufactured by The Babcock & Wilcox Co. are in use throughout the world.

The Babcock & Wilcox Co. publishes the following books: "Steam," "Marine Steam," "Stirling," "Rust," "Steam Superheaters," and "Chain Grate Stokers," any of which may be obtained upon application to the nearest of the Company's branch offices.

SEE OUR ADVTS. IN MECHANICAL ENGINEERING THE JOURNAL OF THE A.S.M.E.

Digitized by Google

PHILLIPS BADENHAUSEN

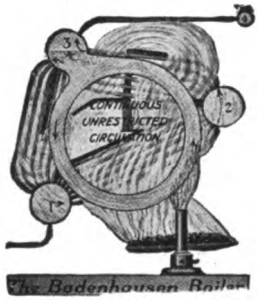
MAIN OFFICE: 1425 CHESTNUT ST., PHILADELPHIA, PA.

WORKS: Cornwells, Philadelphia, on P. R. R. & Delaware River; Bound Brook, N. J.

BOSTON NEW YORK PITTSBURGH CHICAGO BIRMINGHAM, ALA. DENVER SAN FRANCISCO

Manufacturers of Badenhausen Land and Marine Water Tube Boilers and Superheaters; Scotch Marine Boilers

Fig. 1



THE BADENHAUSEN WATER TUBE BOILER in all its forms was designed and perfected by John Phillips Badenhausen, M.M.E., whose expert knowledge in economical and efficient steam production has enabled him to place on the market a boiler having positive, continuous, and unrestricted circulation with the attending ability to operate at daily high efficiency and to respond to instantaneous, unlimited, and long-continued overloads without heat waste or boiler injury. In addition to these high water marks in boiler design is the ability to deliver at the boiler outlet, steam that is dried and superheated to a guaranteed average of not less than 10 deg. Fahr. at any rating.

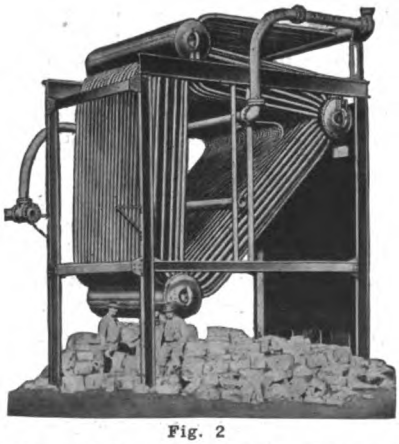


Fig. 2

THE PRINCIPLE OF PERFECT CIRCULATION (Fig. 1) is best illustrated by a glass ring superimposed upon the boiler, proving that the water has a path of equal area throughout, leaving no part dry to the action of the fire. Curved steel tubes connect steel drums numbered 1, 2 and 3. Feed water enters Drum 1. The steam, disengaged in Drum 3, is dried and superheated in tubes connecting Drums 3 and 4. For high degrees of superheat, Simplex Superheaters are provided (Figs. 2 and 3).

The Badenhausen Water Tube Boiler is built in Standard design (Figs. 1 and 2), Preheater design (Fig. 3) and in double-ended forms of these designs. The boiler

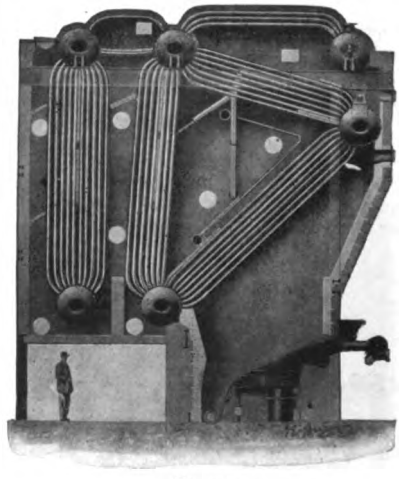


Fig. 3

and furnace dimensions are varied to meet varying steam requirements and space conditions. Combustion areas are accurately designed. Each boiler as a whole is flexibly attached to a rigid steel structure (Fig. 2). Hinged drum manhole doors and convenient setting doors provide easy access. All parts of boiler can be touched by the hand. The construction conforms to the A. S. M. E. Boiler Code requirements.

The shops at Cornwells, Pa., produce Badenhausen Water Tube Boilers, Simplex Superheaters, also Scotch Marine Boilers without any punching of holes as all holes are drilled from the solid.

Send for catalogues and specifications.

Digitized by Google

BASS FOUNDRY & MACHINE CO.

Established 1853

FORT WAYNE, IND.

Manufacturers of Boilers, Heaters, Steel Plate Work, Rope Wheel Drives, Car Wheels, Castings, Heavy Iron and Steel Forgings

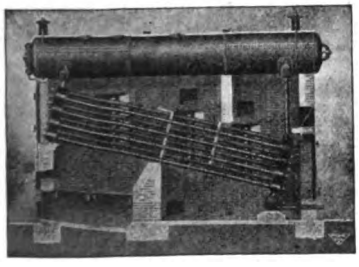
HORIZONTAL TUBULAR BOILERS:

15 to 200 H. P.



HORIZONTAL AND VERTICAL WATER TUBE BOILERS:

In sizes from 50 to 1000 H. P.

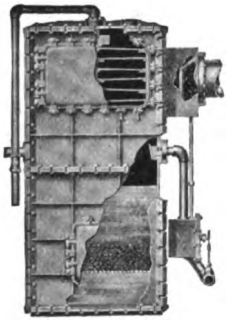


OPEN FEED WATER HEATERS:

Cast iron or steel.

Both Horizontal and Vertical.

Built in all sizes.

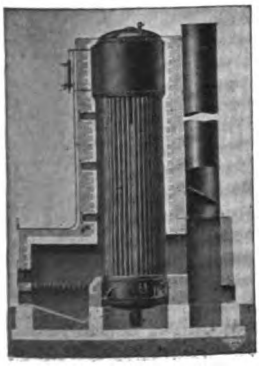


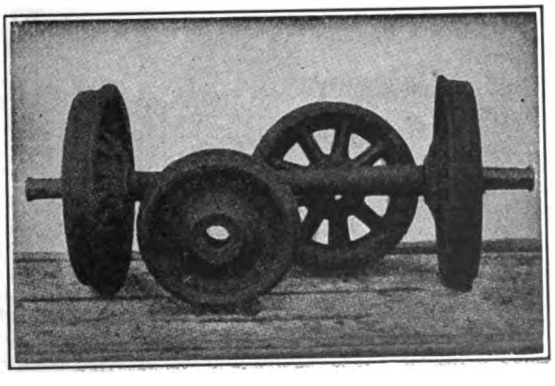
SEND FOR A COPY OF

"STEAM POWER"

which illustrates the different types of Boilers, Heaters and other power plant equipment which we manufacture.

CHILLED IRON CAR WHEELS
CAR WHEELS ON AXLES:





Digitized by Google

THE BIGELOW COMPANY

WORKS AND MAIN OFFICE

76 RIVER ST., NEW HAVEN, CONN.

NEW YORK OFFICE, Singer Building — BOSTON OFFICE, Oliver Building

PHILADELPHIA OFFICE, Commercial Trust Building

Manufacturers of Fire Tube and Water Tube Steam Boilers, Heavy Plate Steel Work

THE BIGELOW-HORNSBY WATER TUBE BOILER:

Some of the features of the Bigelow-Hornsby Boiler that meet the requirements of Modern Power House Practice:

Unlimited size of units, 3000 H. P. or more.

Small ground space occupied.

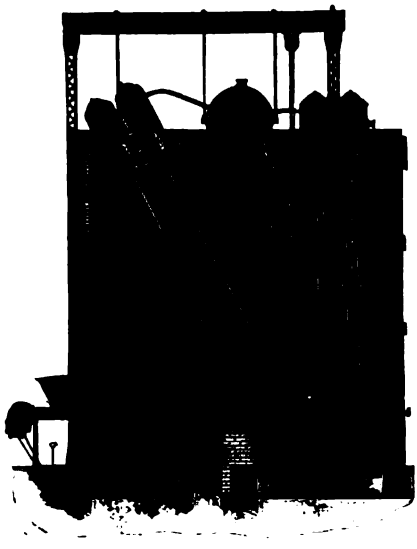
Coldest water meets the coldest gases.

All parts, both external and internal, readily accessible.

All boiler tubes perfectly straight.

Circulation of water and liberation of steam unrestricted.

Very dry steam, also ample room for superheaters where required.



Bigelow-Hornsby Boiler

High continuous economy due to extreme cleanliness of the most efficient heating surface.

Arrangement of baffling is such that the gases pass over the heating surface in thin streams and uniformity at every point.

Furnace arrangement is ideal for securing perfect combustion, as furnace is correctly shaped and of ample size.

Greatest flexibility, both as to construction and in steaming qualities.

No cast iron used in any portion of the boiler proper.

Constructed both as to workmanship and material in accordance with the most advanced boiler practice.

THE BIGELOW-MANNING BOILER:

This type of boiler can be constructed suitable for 200 pounds working pressure. The shell sheets being away from contact with the fire permits the use of any thickness of shell necessary for high pressures.

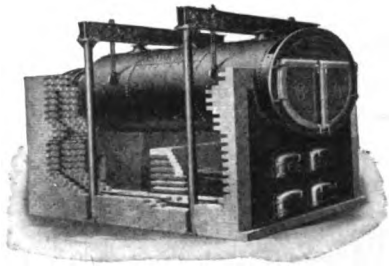
The economical evaporative performance of the Bigelow-Manning Boiler is remarkable. All radiant heat from the fuel bed is absorbed directly by water-heating surface, the distribution of the furnace gases over the heating surface is practically uniform, the superheat furnished is varied by changing the water level, there are no losses due to the infiltration of air in the setting and stand-by losses are comparatively small, occupying per H. P. much less ground space than other types of boilers.



Bigelow-Manning

RETURN TUBULAR BOILER:

The advantages of compactness and efficiency, large direct heating surface, easy cleaning, large



Suspension Type of H. R. T.

liberating surface, perfect circulation and minimum liability and ease of repairs, are well-known features of this type.

Our boilers are constructed in the most approved manner; we adopt the very highest type of professional and mechanical service, maintain the highest possible standard of efficiency, and believe our facilities for boiler construction are without a parallel.

SEE CORRESPONDENCE MECHANICAL ENGINEERING A-5448

Digitized by Google

THE BROWNELL COMPANY

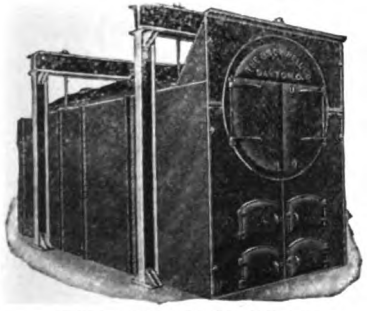
DAYTON, OHIO

SALES REPRESENTATIVES IN ALL SECTIONS OF THE COUNTRY

Manufacturers of Engines, Boilers, Feed Water Heaters and Tanks

BOILERS:

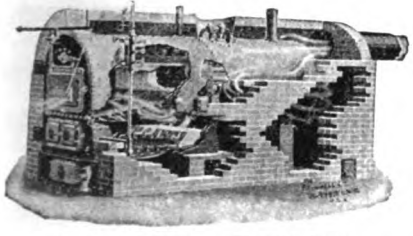
Types—Horizontal Tubular, Locomotive Type Portable, Scotch, Vertical Tubular, Firebox Heating, Oil Country.



H. T. Boiler with Steel Casing

The Company is prepared to build fire-tube boilers of all types according to the A. S. M. E., various state and municipal Codes. Only the best quality material is used. The design, as well as the workmanship, is of the highest grade and according to the latest known practice. Horizontal Boilers are built in sizes from 15 to 250 horsepower for steam pressures up to 150 pounds.

Steel casing settings, as illustrated, are especially economical, practically eliminating the defects of brick settings and reducing maintenance expense. *Bulletins B-1* and *B-4*.



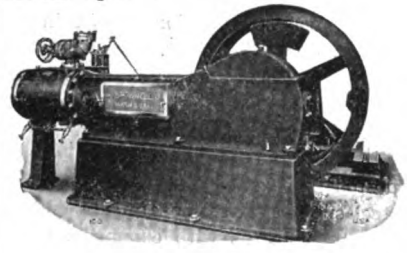
Smokeless Brickset Heating Boiler

Brownell Smokeless Portable and Brickset Firebox Heating Boilers are built according to the A. S. M. E. Code for either steam or hot water installation. They meet the most rigid requirements of smoke ordinances. Portable type boilers only require brick work for the ash pit. Direct draft boilers are built in both types. *Bulletins B-6* and *B-6A*.

STEAM ENGINES:

Types—Automatic, Throttling, Fan, Variable Speed Duplex, Vertical, Oil Country Drilling.

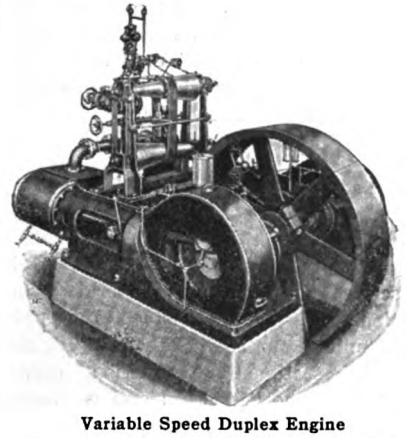
Brownell engines are especially designed for severe and continuous service. Horizontal engines are of the side crank type with slide valves. Vertical engines are center crank, the Enclosed Verticals also have piston valves.



Enclosed Automatic Engine

High Speed Automatic Engines are built in the enclosed self-oiling or the open type. The inertia governor in the fly wheel is guaranteed to regulate the speed of the engine within 2% from friction to full load. *Bulletins E-1* and *E-2*.

Variable Speed Duplex Engines were especially developed and are constantly being improved to keep pace with Paper Mill progress.



Variable Speed Duplex Engine

Illustrated bulletins of Brownell Products will be mailed upon request.

Digitized by Google

THE CASEY-HEDGES CO.

Founded 1889

CHATTANOOGA, TENN.

CHICAGO
MEMPHIS
DALLAS

NEW ORLEANS
SEATTLE
HAVANA, CUBA

NEW YORK
BIRMINGHAM
SAN JUAN, P. R.

Manufacturers of All Types of Boilers and Plate Metal Work

Boilers built in accordance with A. S. M. E. Code when desired.

C-H HORIZONTAL WATER TUBE BOILERS:

All steel construction. Built in units from 75 to 1000 H. P. Oval handholes with machined surfaces. With either Horizontal, Vertical or Combination Baffles. Large areas through water legs permitting rapid circulation. Boiler supported free from brick work by wrought steel supporting frame at front end; the rear by columns with expansion saddles and rollers.



C-H Horizontal Water Tube Boiler, **Vertical Baffle**

C-H HORIZONTAL WATER TUBE BOILERS:

With Steel Cased Setting

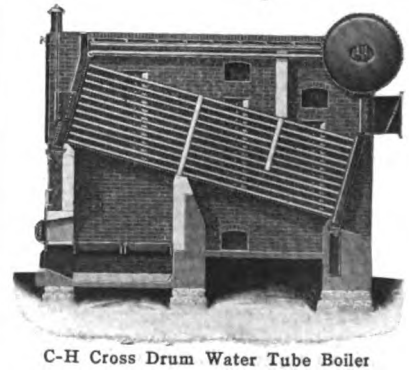
This type of setting entirely overcomes the defects of the brick setting, which consist chiefly of air leaks due to expansion and contraction; also reduces maintenance cost and decreases cost of foundations. Steel casings may be applied to either the Horizontal or Vertical Baffle types. The steel casing may also be used in conjunction with stokers.



C-H Horizontal Water Tube Boilers with Steel Cased Setting

C-H CROSS DRUM WATER TUBE BOILER:

Designed for heavy duty power plant service and continuous overload conditions. Built of all steel construction, in units from 75 to 2,000 H. P. Boiler is of sectional construction, may be shipped knocked down and is especially desirable for export work. Boiler may be equipped with Superheater and arranged for any type of Stoker.



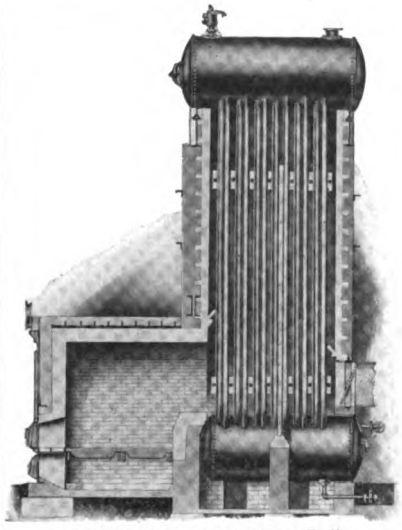
C-H Cross Drum Water Tube Boiler

Digitized by Google

THE CASEY-HEDGES CO. CHATTANOOGA, TENN.

C-H VERTICAL WATER TUBE BOILER:

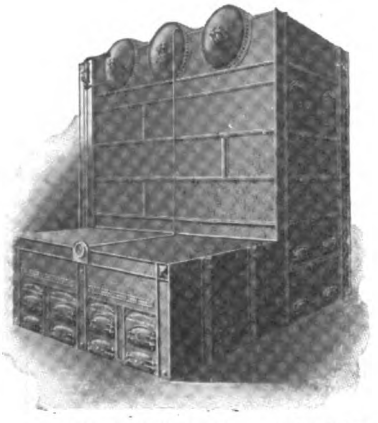
This boiler is of simple construction and very efficient. Consists of one or more upper drums, connected to one or more lower drums by a series of tubes placed in staggered rows. Baffles are set vertically in boiler and may be arranged for either two or three passes of the hot gases through the tube heating surface. Tubes enter drums radially, and are curved to an easy radius. Boiler is of unit construction; therefore, the size is unlimited. Furnace is of Dutch Oven construction.



C-H Vertical Water Tube Boiler

C-H VERTICAL WATER TUBE BOILER WITH STEEL CASING:

The C-H Vertical Water Tube Boiler is an ideal boiler when steel-encased. A special design of steel casing is used, built in sections. Each section is provided with tie bar lintels that hold the wall in place, preventing buckling or bulging inward of the brick work. It is unncessary to discuss the value of the steel casing, as it is well known.



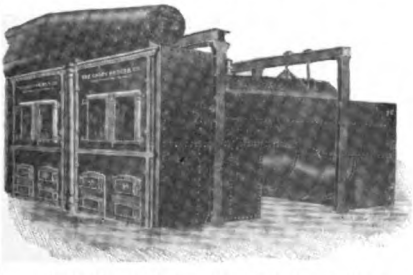
C-H Vertical Water Tube Boiler with Steel Casing

C-H HORIZONTAL RETURN TUBULAR BOILER WITH STEEL CASING:

We originated the steel cased type of boiler setting, and have perfected three well-known types; *viz.*, Standard, Full Dutch Oven and Semi-Dutch Oven. Steel Casing construction of heavy steel and braced with angles. Will save 33⅓% in brick work and 60% in foundation. The steel setting is absolutely air-tight; does away with expansion leaks in brick work; has practically no maintenance cost; assembled complete before shipping; may be installed by a novice.

Catalogue of the Casey-Hedges' Products Will Be Furnished on Application.

SEE OUR ADVTS. IN MECHANICAL ENGINEERING THE JOURNAL OF THE A.S.M.E.



C-H Steel Casing for Tubular Boilers

Digitized by Google

COATESVILLE BOILER WORKS

WORKS: COATESVILLE, PA.

NEW YORK, N. Y. 30 Church St. | BOSTON, MASS. 141 Milk St. | RICHMOND, VA. Amer. Natl. Bank Bldg. | PHILADELPHIA, PA. Morris Bldg.

PRODUCTS:

Manufacturers of A. S. M. E. Code Horizontal Return Tubular Boilers, Vertical Boilers, Steel Tanks for High Pressure Work, Tanks for Storage Purposes and Tanks for Special requirements.

Heavy Steel Plate Construction including Stills for Oil, Asphalt and Chemical Purposes; Dryers, Digestors, Blast and Open Hearth Furnaces, Stack, Riveted Pipe, etc.

Steel Tanks and Miscellaneous plate work furnished either riveted or welded.

Grey Iron Castings and Machine Work.

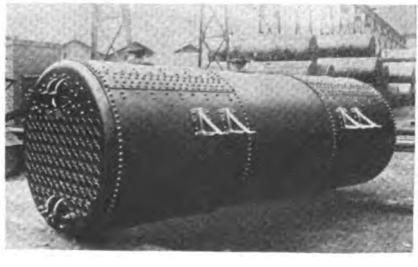
COATESVILLE BOILERS:

Coatesville high duty return tubular boilers are built to the A. S. M. E. Code.

62

The following table gives our standard sizes which are ready for prompt shipment.

Diam. in Inches	Length in Feet	Number of Tubes	Diam. of Tubes	Working Pressure Lbs.	Horse Power
60	16	54	3½	150	94
66	16	72	3½	150	122
66	18	72	3½	150	137
66	18	54	4	150	118
72	16	96	3½	150	158
72	18	96	3½	150	177
72	18	72	4	150	153
72	20	72	4	150	169
78	18	118	3½	145	200
78	20	88	4	145	204
84	20	108	4	135	246



Coatesville A.S.M.E. Code H.R.T. Boiler

QUALITY:

The A. S. M. E. Boiler Code gives the necessary data for a high grade boiler. We have not only complied with every detail required by the code, but have, in a number of items, furnished heavier material than actually required, so as to insure the best possible boiler for power purposes.

Thirty years' experience building high pressure boiler enables us to now manufacture the best possible A. S. M. E. Code Boiler.

The fronts and miscellaneous castings furnished with the standard equipment are all heavy and of the best design.

STEEL TANKS AND HEAVY STEEL PLATE CONSTRUCTION:

We carry in stock 10,000 gal. steel tanks, 7 ft. in diameter by 35 ft. long, tested to 75 lbs.

Our experience in the construction of steel tanks for all purposes, and of heavy steel plate work, has been very extensive.

We are always pleased to have our sales engineers call and go over in detail your exact requirements, thereby enabling us to properly design tanks or special work to fill your requirements to the best possible advantage. Inquiries by mail will be given the best possible attention; however, a personal interview is recommended wherever possible.

FIELD ERECTION:

The erecting organization is in charge of a thoroughly competent and experienced erecting engineer. We are therefore at all times fully equipped to carry to completion all orders for large tanks and miscellaneous heavy plate work which must necessarily be shipped knocked down and erected at destination, all such orders being completed under our personal direction and with our organization.

CATALOGUE:

Our General Catalogue No. 24, containing 96 pages, illustrates in detail "What We Make." A copy of this catalogue will be sent on request.

Digitized by Google

R. D. COLE MANUFACTURING CO.

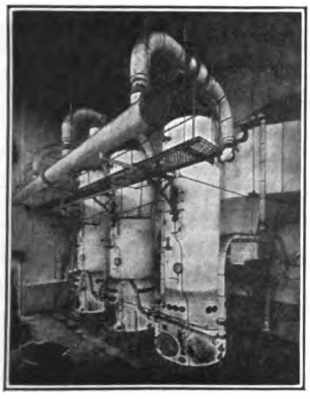
Established 1854

NEWNAN, GEORGIA

Manufacturers of Boilers, Engines, Elevated Tanks, and Steel Plate Work

COLE-MANNING BOILER:

This type boiler is constructed in units up to 400 horse power and for pressure of 200 lbs. or more. Boiler shell is supported on a one-piece cast iron base, which can be fitted with stationary or shaking grates. Smoke box provided with removable cast iron cover and provided with connection for all standard soot-cleaning devices.



The evaporative performance, super-heating qualities and small floor space per horse power contribute to make this type boiler a most desirable and economical unit.

HORIZONTAL RETURN TUBULAR BOILER:

These boilers are constructed in a most approved manner and of materials in full accordance with the A. S. M. E. Code. Standard settings can be provided with stationary or shaking grates and where increased efficiency and compactness are desired, standard steel casings can be provided for these settings. These boilers are designed with liberal proportions of heating surface, steam space and grate area, and within the limits of their usefulness are unsurpassed as steam generators. These boilers are constructed in



units up to 250 horse power and for steam pressure of 200 lbs. per square inch.

ELEVATED STEEL TANKS:

Special designs for steel sprinkler tanks or domestic service will be furnished by our Engineering Department. Our elevated tanks are correct in design and the simplicity of the structure contributes to its low cost of maintenance. Sprinkler tanks and equipment are designed to incorporate the recommendations of all in-



surance authorities. Our facilities provide for the design and construction of all forms of steel plate work, including STACKS, ACID TANKS, PRESSURE VESSELS, STRUCTURAL FRAMES AND TOWERS.

SEE OUR ADVTS. IN MECHANICAL ENGINEERING THE JOURNAL OF THE A.S.M.E.

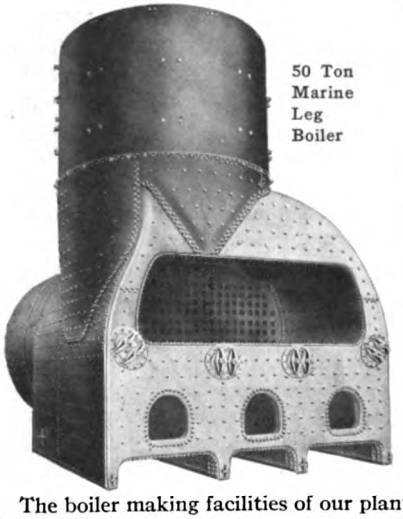
Digitized by Google

NEWBURGH STEAM BOILER WORKS

P. DELANY & CO.
NEWBURGH, N. Y.

Manufacturer of all Types of Marine and Land Service Boilers, Tanks, Stacks, Grates, Dryers, Mixers, Kiers and Steel Plate Work

STATIONARY AND MARINE BOILERS:



50 Ton Marine Leg Boiler

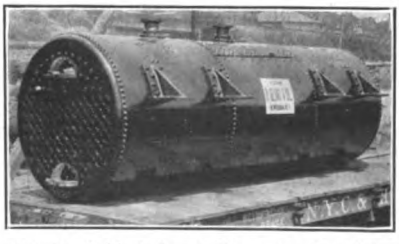
The boiler making facilities of our plant for both marine and stationary service are equal to any demand made, regardless of the size of the unit or the number of units wanted.

Scotch marine boilers are made in all sizes.

Marine Leg type are made in all sizes.

Locomotive boilers are stocked in sizes from 16 to 100 H. P. and 100 lb. pressure and 150 lb. pressure.

Return Tubular boilers are made in all sizes.



Vertical Tubular boilers are furnished in all sizes.

So that our boilers may always be of uniform quality we maintain a modern inspection and testing department. Boilers built to all codes and in keeping with your state boiler laws.

Catalogues giving detailed dimensions of standard boiler will be sent upon request.

STEEL STACKS:

Stacks, flues and breechings made to meet all conditions. Tall stacks amply provided with guys and lattice bracing.

GRATES:

We cast both dumping and stationary grates. The bars are clean, free from slag, blow-holes and other imperfections. Made in several patterns.

STEEL TANKS: Large and small, open and closed, atmospheric and pressure tanks made for all purposes. Square and round tanks, jacketed or plain, riveted or welded made to perform the service required.



DRYERS:

We make dryers with or without jacket for fabrics, hospitals and general drying purposes.

MIXERS, DIGESTERS:

Paint works, chemical factories and the like are large buyers of steam jacketed mixers made by us. Made with large or small capacity of simple rugged construction. Lead lined if required.

KIERS:

We also build kiers for bleacheries. They are simple, yet substantial in construction and can be furnished with or without a circulating system.

Send for more detailed information regarding apparatus you are interested in.

Digitized by Google

EDGE MOOR IRON COMPANY

EDGE MOOR, DELAWARE

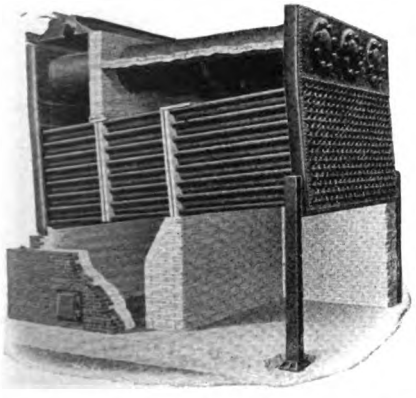
NEW YORK
111 Broadway

BOSTON
79 Milk Street

CHICAGO
10 S. La Salle Street

Manufacturers of Edge Moor Water Tube Boilers

The Edge Moor Water Tube Boiler is designed for heavy duty under exacting conditions and is built to conform to the best standards. All Edge Moor boilers are constructed in accordance with the A. S. M. E. Boiler Code, except when the



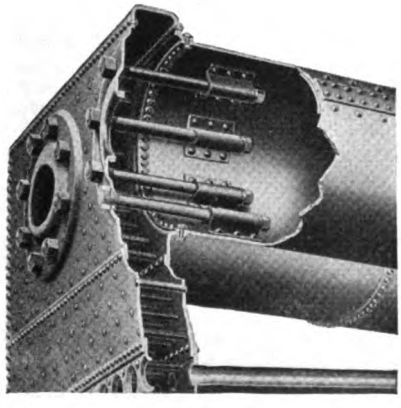
laws of states or localities where the boilers are to be installed require variations from this code.

For modern power plants where high pressures are desirable the special features of the Edge Moor design and the careful construction of the boiler produce a sturdy boiler that meets the demands of continuous, hard service. As shown in the above illustration the drums are horizontal, and the tubes are straight. Every tube is accessible through an elliptical handhole in the header plate directly opposite and can be removed through either header.

The illustration opposite indicates clearly the construction of the box headers and the large, unrestricted connection between headers and drums. Each header consists of a tube plate and handhole plate, effectively stayed, and connected together by forged troughs at top, bottom and sides. The headers extend at full width above the top of the drums, giving additional space for the liberation and storage of steam. The drums are bolted to the headers by a special connection which eliminates the uncertainties of riveting in the field.

Each handhole is fitted with an oval cover which bears against the inside of the header plate and is removable through its own handhole. The edges of handholes are flanged inward for stiffening the plate and are machine-faced to insure a perfect bearing surface for the gaskets. Baffles are vertical and of three-pass or four-pass design.

Edge Moor boilers are custom built. Dimensions for a given horsepower are flexible, and every boiler is designed to produce the maximum efficiency under the operating conditions. All parts subject to pressure are of steel.



WASTE HEAT BOILERS:

For the utilization of waste gases this company has developed an adaptation of its standard boiler, which contains all of the special Edge Moor features. This boiler is now being successfully operated in steel mills and cement plants, where, installed in accordance with the designs of our engineers, it has proved a commercial success.

Digitized by Google

ERIE CITY IRON WORKS

ERIE, PENNSYLVANIA

Manufacturer of Vertical Water Tube Boilers, Horizontal Water Tube Boilers, Return Tubular Boilers, "Economic" Portable Boilers, Shaking Grates, Powdered Coal Apparatus

HORIZONTAL WATER TUBE BOILER:



What is your operating boiler efficiency? Erie City Horizontal Water Tube Boilers are so designed as to make possible maximum efficiency under average conditions.

They are carefully constructed, only the best materials being used.

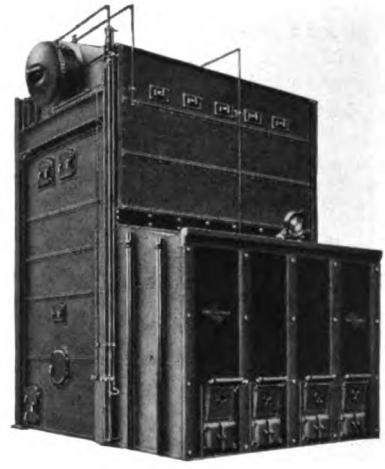
Some of the features responsible for the success of these boilers are its free circulation, ample steam liberating surface, large steam holding capacity, correct baffling and the correct ratio for heating surface. The tubes are of the most efficient diameter and length. All openings and outlets are conveniently placed and of the proper design. These boilers require the minimum headroom. The minimum amount of common and fire brick are needed for boiler settings.

The material is selected with utmost care, formed and cut with modern tools and fabricated by skilled mechanics who have had years of training in correct boiler building.

Erie City Horizontal Water Tube Boilers can be provided with regular grates, shaking grates, mechanical stokers, gas or oil burners. The furnace can be designed for wood, refuse, bagasse or similar fuels. They may be had with or without superheaters.

These boilers are regularly stocked in 7 sizes, 150, 200, 250, 300, 350, 400, and 500 horse power, with working pressures of 160, 180 and 200 lbs. Larger or higher pressure boilers built to order.

VERTICAL WATER TUBE BOILER:



These boilers are designed to deliver, and in actual operation do deliver dry steam at a lower cost than any other known type of boiler.

The tubes being upright, are completely surrounded by the moving gases, resulting in a maximum heat absorption, as well as very rapid circulation of water through the tubes.

There are no handholes or other unnecessary and trouble-causing joints.

The entire weight of the boiler is carried by a self-contained steel structure. The boiler is suspended by the upper drum and thus permits unrestricted expansion and contraction.

This boiler can be supplied with or without a superheater. Provision can be made for firing with various grades and kinds of fuel. Regular straight grates, shaking grates or any type of mechanical stoker may be applied.

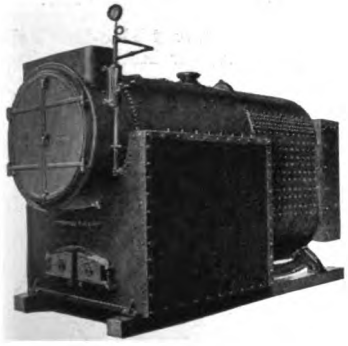
These boilers are regularly carried in stock at our works in units up to 1000 horse power.

If you have an unusual condition to meet as an extraordinary steam temperature, space limitation or fuel problem, let our engineering department aid you in its solution.

Digitized by Google

ERIE CITY IRON WORKS — ERIE, PA.

ERIE CITY ECONOMIC BOILER:



For over 25 years the Economic tubular boiler has proven a gratifying success because of its careful and thorough construction, its mobility, its economy, safety and durability.

It is built different from the usual type of portable boiler. There are no stay-bolted water sides to fill with sediment and burn out or flat crown sheets to be exposed by low water and thereby cause an explosion.

The materials used are of the same high quality as our stationary types and conform to the requirements of The American Society of Mechanical Engineers. The furnace is fire brick lined with suitable air spaces to prevent excessive heat radiation warping plates.

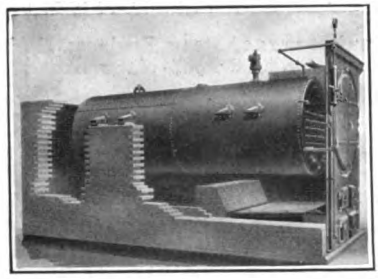
These boilers can be furnished complete with grates, steam gauge, water gauge, gauge cocks, safety valves, blow-off valves, check valves, stop valves, smoke stack and guys.

Boilers are subjected to hydrostatic test, 50% in excess of proposed working pressure. A certificate of inspection can be had by purchaser on request.

Made in sizes from 20 to 150 horse power for 100, 125 and 150 lbs. working pressure.

SEE OUR ADVT. IN MECHANICAL ENGINEERING THE JOURNAL OF THE A.S.M.E.

HORIZONTAL TUBULAR STATIONARY BOILER:



Erie City Return Tubular Boiler

Made of the best material, correct design and fabricated by careful workmen. The best homogeneous steel is used. Tubes are standard gauge mild steel.

The design is the product of many years of experience and is in keeping with the best boiler practice. Butt joints, with inner and outer straps, are standard for longitudinal seams. Our plates are rolled the correct thickness throughout, checked by micrometer measurement. Ample bracing is used throughout. All openings and outlets are carefully designed for accessibility and safety.

The workmanship is kept at a high standard. All rivet holes are punched on a multiple punching table for accuracy, reamed and every rivet driven by machinery. Caulking is done with pneumatically driven round-nosed tools. Tubes are set in reamed and chamfered holes with a roller expander and carefully beaded.

Erie City Boilers are designed with a minimum factor of safety of five.

Each boiler is subjected to a hydrostatic test 50% in excess of proposed working pressure and is carefully inspected throughout while under this pressure.

The stock sizes range from 20 to 200 horse power for 100 lbs. working pressure and from 50 to 200 horse power for 125 to 150 lbs. working pressure.

Catalogues describing our boilers will be sent on request.

Digitized by Google

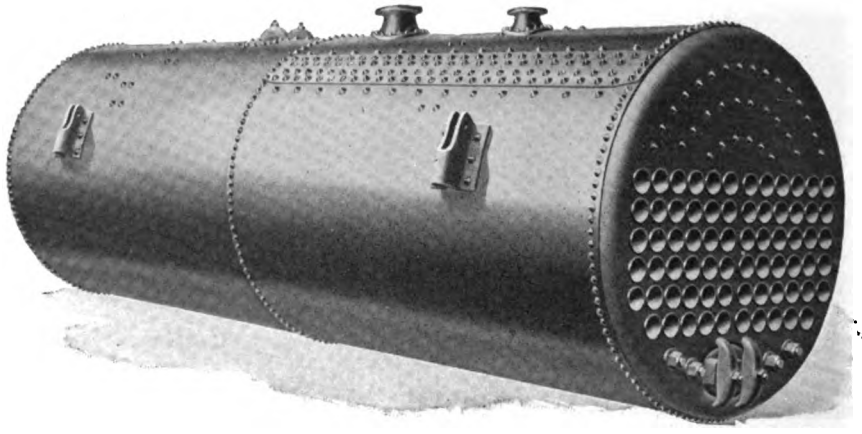
THE FROST MANUFACTURING CO.

Established 1851

WORKS: GALESBURG, ILL.

GENERAL SALES OFFICE: 112 W. ADAMS ST., CHICAGO, ILL.

Manufacturers of Steam Engines; Horizontal, Tubular, Vertical, and Fire-Box Boilers; Open and Closed Feed-Water Heaters and Purifiers; Tanks, Air Receivers, Special Plate Work, etc.



FROST

RETURN TUBULAR BOILERS:

Our Horizontal Return Tubular Boilers are built to the requirements of the A.S.M.E. Code from 36″ to 108″ diameter and for working pressures allowed by the Code. All castings are made in our own foundry insuring the necessary grade of iron for the work. Exceptional drilling and plate planing facilities allow us to build for the highest pressures and the largest diameters. We are particularly careful in setting diagonal braces and through rods so our boilers can be accessible for inspection.

Our **Vertical Boilers** are regularly built in sizes up to 60 H. P.

Our **Fire Box Boilers** are built in sizes up to 150 H. P.

(See page 634 for additional products of this Company)

Digitized by Google

E. KEELER COMPANY

Established 1864

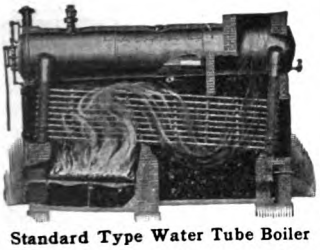
WILLIAMSPORT, PA.

NEW YORK BOSTON PHILADELPHIA PITTSBURGH CHICAGO
BUFFALO PORTLAND, ORE. CLEVELAND

Manufacturers of Water Tube and Tubular Boilers. Steel Plate Work

KEELER WATER TUBE BOILERS:

Standard Type: The arrangement of furnace, tubes, headers and drum in the Keeler Water Tube Boiler is efficient, accessible and compact. The superior efficiency of the Keeler Boiler rests upon correct proportions of heating and grate surface for the character of fuel to be burned, ample height of furnace, a superior arrangement of baffle walls and a perfect circulation. Every portion of the heating surface is accessible for both external and internal inspection, making it impossible for soot or scale to accumulate undetected. There is ample room between tubes and drum for inspection or repairs. Special patented side cleaning doors make it possible to observe the condition of the outside surface of the tubes. There is no part of the interior surface that cannot be examined and cleaned.

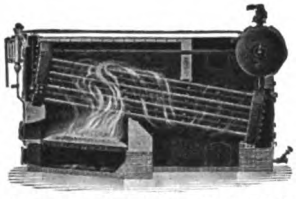


Standard Type Water Tube Boiler

Keeler Water Tube Boilers are usually built complete and tested in the shop. This reduces the cost of erection, as the boilers are handled as a unit. It also eliminates the dangers due to careless assembling of boilers in the field and makes the erection merely a matter of placing in position and attaching fittings.

Built in units 75 to 1500 H. P.

Cross Drum Type: The Keeler Cross Drum Water Tube Boiler is a modification of the standard design, only in the length and location of the drum and the method of connecting it to the headers. This type was developed to meet the demand for a high pressure water tube boiler that could be installed in Office Buildings, School Houses, Churches, Apartment Houses, Hotels and boiler rooms generally where ceiling height is limited or where the boiler must be introduced through narrow passageway or restricted openings.



Cross Drum Type Water Tube Boiler

The pressure parts of the boiler are shipped in a knocked-down condition, making it possible to install it without cutting through walls and floors in locations that would be wholly inaccessible for almost any other type of boiler. If boilers are to be exported, the cross drum boiler can be handled at much less expense by steamship companies on account of its reduced bulk in a knocked-down condition, and the comparatively small weight of the heaviest piece.

Built in units 60 to 1000 H. P.

69

KEELER HORIZONTAL RETURN TUBULAR BOILERS:

Our return Tubular Boiler is the product of fifty-seven years' experience of boiler building. Tube holes are drilled from the solid plate, and not punched small and reamed to size. All seams are thoroughly caulked on the outside, and the end of butt straps are caulked on the inside. Braces are drop-forged. Steam



Horizontal Return Tubular Boiler

and safety valve outlets are provided with wrought steel connections of an approved type. Manhole plates, yokes and brackets are of pressed steel. All boilers built to A. S. M. E. requirements.

FIFTY-SEVEN YEARS OF BOILER BUILDING

Ask for Catalogs

SEE OUR ADVTS. IN MECHANICAL ENGINEERING THE JOURNAL OF THE A.S.M.E.

Digitized by Google

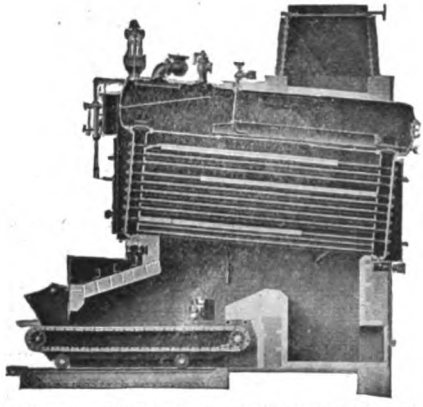
HEINE BOILER COMPANY

GENERAL OFFICE, ST. LOUIS, MO.

SHOPS: ST. LOUIS, MO., AND PHOENIXVILLE, PA.

NEW YORK	BOSTON	PITTSBURGH	SAN FRANCISCO
PHILADELPHIA	CINCINNATI	CHICAGO	DALLAS
NEW ORLEANS	DENVER	CHARLOTTE	CLEVELAND
DETROIT	HAVANA, CUBA	TORONTO, CANADA	YOKOHAMA, JAPAN

Manufacturers of Heine Longitudinal Drum Boilers, Heine Cross Drum Boilers, Heine Marine Boilers, Steel Stacks, Housings, Flues, Etc.



Heine Longitudinal Drum Boiler Equipped with Chain Grate Stoker

For more than 40 years the Heine Safety Boiler Company has been building water-tube boilers. During that time it has developed a plant and personnel thoroughly equipped and experienced in the design, manufacture, erection and operation of boilers. Heine boilers are built in two large modern plants, one in St. Louis, Mo., and the other in Phoenixville, Pa.

Time has proven that the fundamental principles of the Heine boiler are right, and performance and service have demonstrated that the mechanical construction is second to none. All Heine boilers more than meet the requirements of the A.S.M.E. Boiler Code.

Heine boilers are built for hard driving and can be counted on for 200 and 300 per cent rating with very little sacrifice in efficiency, providing the furnace and draft conditions are correct, because all Heine boilers are equipped with a flexible system of baffling that can be modified to suit the actual conditions of service. They are all equipped with the internal mud drum, and all have special provision for delivering dry steam.

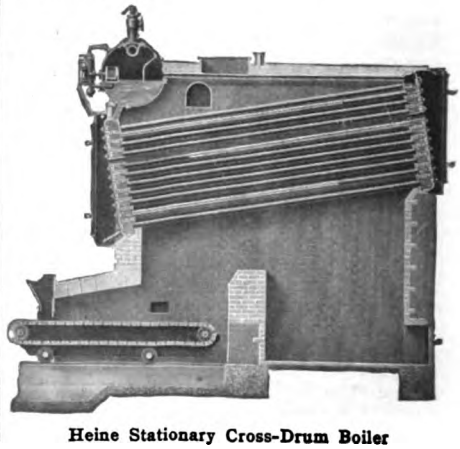
THE HEINE LONGITUDINAL DRUM BOILER:

The principle of the Heine longitudinal drum boiler is shown in the accompanying illustration. The boiler consists of two single-chamber water legs connected by straight tubes perpendicular to the sides of the water legs. Across the top, the water legs are joined to one or more drums which provide the necessary space for the separation of steam and water. The standard practice of the company is to use horizontal baffles, although vertical baffles can be used where it is considered advisable.

Feed water is brought into an internal mud drum where it is heated to the boiler temperature before entering the circulation path. Consequently practically all sediment is deposited in this drum where it can be blown off before it has an opportunity to enter the working parts of the boiler.

One of the outstanding features of the Heine method of construction is the efficient use of space. The single-chamber water legs give a maximum circulation area with a minimum space. The straight tubes being perpendicular to the sides of the water legs are easy to clean and inspect. The horizontal baffle tile being laid between the tubes are easy to insert and keep in proper condition. In fact, without any great difficulty, they can be changed to accommodate existing conditions and the service requirements of the boilers. By removing or changing the location of the baffles, the length and area of the gas passage can be varied over a wide range, so as to give the best operating conditions in each particular case.

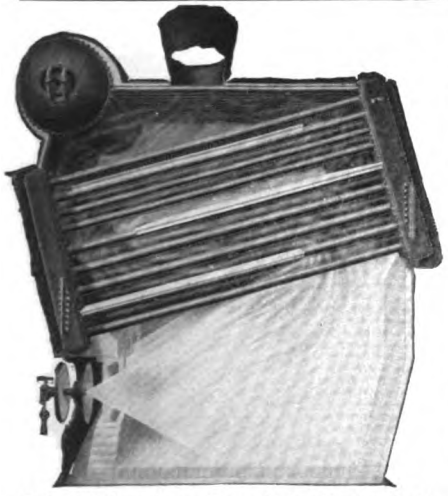
The boiler can be thoroughly cleaned inside and outside from front and rear, side openings not being necessary. Therefore, inleakage of air to the setting can be completely eliminated without difficulty.



Heine Stationary Cross-Drum Boiler

Digitized by Google

HEINE BOILER COMPANY — ST. LOUIS, MO.



Heine Marine Cross-Drum Boiler Equipped with Oil Burners

HEINE CROSS DRUM BOILER:

This boiler, which is shown on the preceding page, possesses many of the features of the longitudinal type Heine boiler. It consists of two single chamber box headers connected by straight tubes perpendicular to the boxes. The drum is placed above and across, slightly to the rear of the front or lower header to which it is connected by nipples and to the rear header by tubes. The feed water enters a purifier located in the drum where dissolved impurities which are precipitated at steam temperatures are deposited, as is matter carried in suspension. The steam arises in the rear header, where its primary separation from the water is promoted by a device in the upper part. It then passes through the horizontal tubes to the drum which it enters behind a deflection plate attached to the shell and extending below the water level. This plate is not quite as long as the drum, openings being left at each end through which the steam passes and thence into the perforated dry pipe at the top of the shell and which is connected to the steam outlet.

In operation this boiler has the same advantage as the longitudinal drum boiler as regards the baffling, cleaning, feed water purification, production of dry steam and overload capacity.

For shipments where size is a factor and particularly for export, this type of boiler is preferable, as the several parts are of moderate weight, easily handled, and assembling after arrival at destination is a simple mechanical operation. The drum requires no crating and in it may be packed many of the small parts. Only the front and back of the box headers need protection for which a simple covering of boards suffices. The tubes are wired in bundles of three and the other parts crated in such manner as their nature dictates.

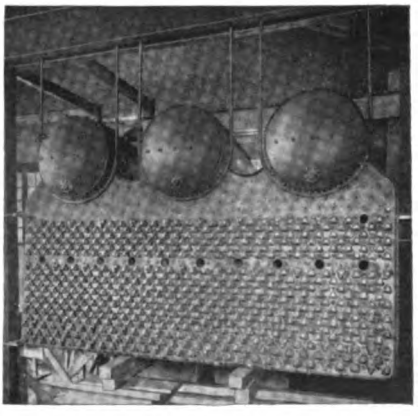
THE HEINE MARINE BOILER:

There are two types of Heine Marine boilers, cross-drum and the longitudinal drum.

All Heine Marine water-tube boilers are built in accordance with the rules and regulations of the United States Board of Supervising inspectors. They are approved by Lloyd's Register of Shipping and the American Bureau of Shipping. When desired by the purchaser either insurance company is permitted free access to the Heine works, and every opportunity is given for inspection and approval of plans and material entering into the construction of the boiler.

The Heine cross-drum Marine boiler is similar to the stationary Heine cross-drum boiler, except that its proportions have been chosen to meet the special requirements of Marine service. The Heine Marine cross-drum boiler is shown in the accompanying illustration.

The longitudinal drum Marine boiler differ somewhat from the stationary longitudinal drum boiler, in that the tubes are not parallel to the drum, although they are of equal length, straight and perpendicular to the box headers or water legs.



Heine Large-Unit, Three Drum Longitudinal Boiler; tube bank 19 high—in Process of Installation

Write for further details and complete information.

SEE OUR ADVTS. IN MECHANICAL ENGINEERING THE JOURNAL OF THE A.S.M.E.

Digitized by Google

INTERNATIONAL ENG. WORKS, INC.

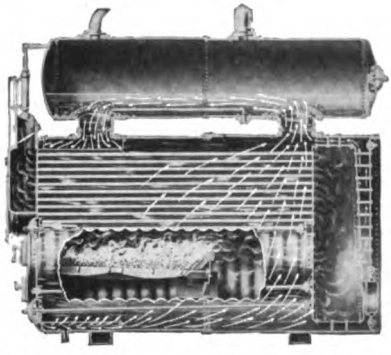
FRAMINGHAM, MASS.

BRANCH OFFICES

BOSTON, MASS. NEW YORK, N. Y.
PHILADELPHIA, PA. SAN FRANCISCO, CAL.

Boilers, Grates and Steel Plate Construction

BRADY SCOTCH BOILERS:



A well designed standard Scotch boiler shows the best all-round efficiency both for marine and stationary service.

Brady Scotch boilers include all the advantages of this class and show a rapid water circulation without a special pump or other device. This positive circulation is obtained by placing an annular ring or plate extending around the inside of the shell just below the front neck (see illustration). Unequal expansion is thus impossible because of the definite circulation from the bottom of the shell.

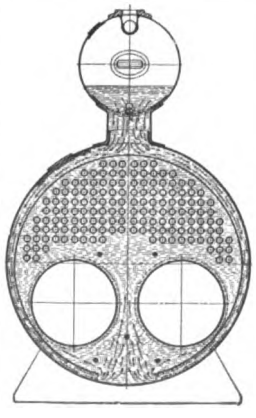
Internal Furnaces: No brickwork is necessary because of the internally fired furnace, hence no brickwork to try or maintain.

Radiation losses are practically eliminated with a corresponding higher efficiency in heat transmission.

No decreased efficiency due to air leakage.

No heavy installation charge, merely pipe and flue connections.

Brady Scotch boilers are built in compliance with such requirements as the A.S.M.E. Boiler Code, various state codes, Lloyd's Registry, British Board of Trade, etc.



VERTICAL TUBULAR BOILERS:



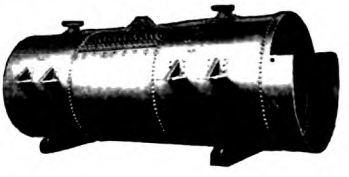
We build straight shell, tapered course and Manning types of vertical tubular boilers.

The Manning type is ideal for high pressure and large units. Especially recommended for turbine service as it can furnish steam superheated 25° to 50°.

As its construction permits of easy cleaning and inspection it is well suited for any locality regardless of water conditions.

Remarkable evaporation obtained and no air infiltration loss. Less space occupied per horse power than other types.

HORIZONTAL RETURN TUBULAR BOILERS:



Constructed of the best materials according to the best practice in accordance with accepted boiler codes.

Heating surface, steam space and grate area liberally proportioned. They are safe, economical, simply designed and cost less per horse power than other types.

Made in units up to 350 h. p.

Special boilers of any size built for all conditions of service.

Digitized by Google

INTERNATIONAL ENG. WORKS, INC., FRAMINGHAM, MASS.

MACDONALD SHAKING GRATES:



The best shaking grates on the market because:

(1) They have unrestricted air passages and a foolproof locking flat grate.

(2) May be repaired or renewed inexpensively by replacing top sections only.

(3) Design permits air opening or grate spacing to be changed at will. Designed for greatest strength in proportion to weight of material.

(4) Gives more perfect combustion, saves fuel and increases boiler capacity.

STEEL PLATE CONSTRUCTION:

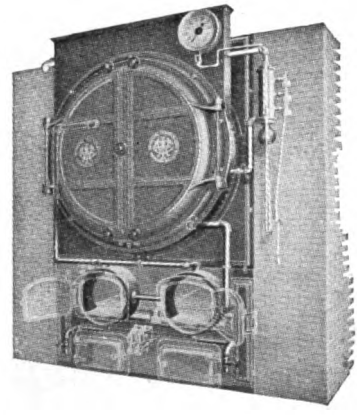
The services of the most efficient and best equipped steel plate construction plant in the East are at your command for plate work of every description from our own designs or your specifications. Exceptional shipping facilities.

ENGINEERING SERVICES:

If you have a problem in boiler, grate or steel plate construction our engineering department will gladly aid you in solving it without obligation to you. Years of experience and an accumulation of valuable data place us in a position to be of service to you.

Let us know the conditions and designs; recommendations and estimates will be forwarded promptly.

SMITH DOOR PROTECTORS:



A water front of improved design built of steel plate allowing for a sediment chamber beneath the grate line. This insures a clean mouthpiece which is free from scale. The sediment accumulation at the bottom is cleaned through the blow-off pipes.

These mouthpieces take the place of the ever-troublesome cheeks and arch and yet providing better support for the upper brick work than formerly.

The use of these protectors eliminates the costly repairs to the boiler front, front masonry, cheek, arch and dead plate replacement. A permanent water front that has a life equal to that of the boiler.

Digitized by Google

KIDWELL BOILER & ENGINEERING CO.

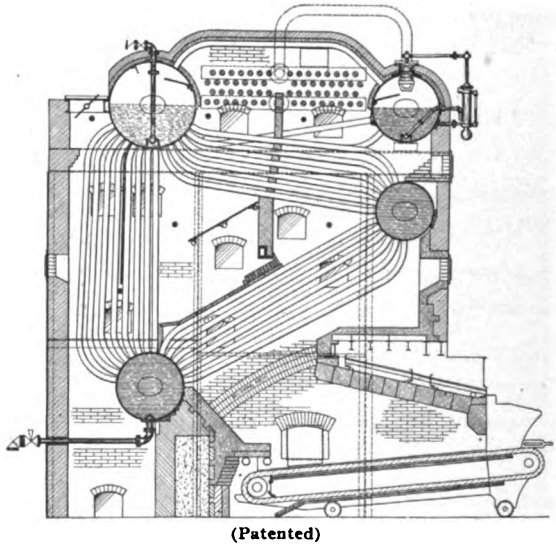
288 EAST WATER STREET, MILWAUKEE, WIS.

HUNT, MIRK & CO.
SAN FRANCISCO, CAL.

J. G. ROBERTSON
ST. PAUL, MINN.

TAYLOR ENGINEERING CO.
VANCOUVER, B. C.

Manufacturer of Water-Tube Boilers



(Patented)

THE KIDWELL RING-FLOW WATER-TUBE BOILER:

Represents the greatest advance in boiler design during the last 30 years, and surpasses all other designs in the following particulars:

(a) Its speed of water circulation is greater, and many times greater than in any header type, and the maximum speed is *over the fire and in the up-cast tubes*, thus preventing overheating of tubes. (b) Its water line is absolutely steady, and identical in both top drums. (c) When water shows in the glass, the rear top drum cannot lose water and overheat and fail. (d) It has more *actual net* water endurance surface than most designs, and this *never decreases when the load increases.* (e) It has a safe overload capacity never before reached, and can operate at 300% to 400% of rating *continuously* with safety, and the steam is superheated 10 to 40 degrees or more, according to the method of firing used. (f) For higher superheats any standard design of superheater can be installed, and for a degree of superheat unattainable with other designs. (g) It automatically removes from the steam all mud and dirt, and thus prevents scaling and burning of superheater tubes. (h) Its material and workmanship are of the highest possible grade. (i) Its design introduces an entirely new principle, the effect of which is that this boiler produces more steam per dollar of investment than can be got from any other without exception.

It has many other important advantages.

Write for particulars.

Digitized by Google

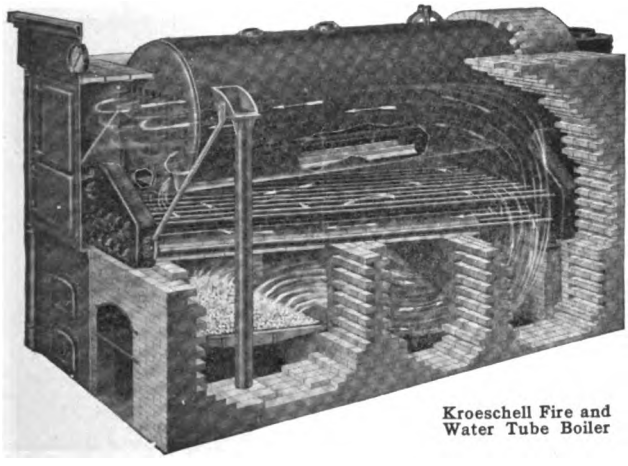
KROESCHELL BROS. CO.

Established 1879

460 WEST ERIE ST., CHICAGO, ILL.

TELEPHONE: Superior 8680—Private Exchange All Departments

Manufacturers of Boilers



Kroeschell Fire and Water Tube Boiler

THE KROESCHELL FIRE AND WATER TUBE BOILER:

Patented 1912

A highly efficient and convenient unit for medium capacities. Built in sizes from 100 to 300 Horse Power.

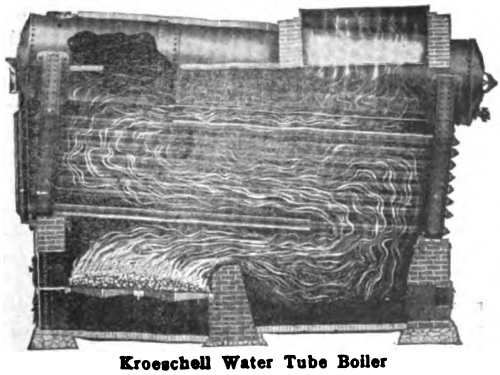
Long Fire Travel, Straight Tubes. All parts readily accessible for cleaning and inspection.

Especially designed for large energy storage and rapid steaming to meet requirements of fluctuating loads. Maximum capacity for minimum floor space.

KROESCHELL WATER TUBE BOILER:

Built for heavy duty service. The excellence of design and construction of this boiler has been demonstrated by over forty years of successful operation.

Sizes 100–700 H. P.



Kroeschell Water Tube Boiler

Digitized by Google

THE GEORGE T. LADD COMPANY

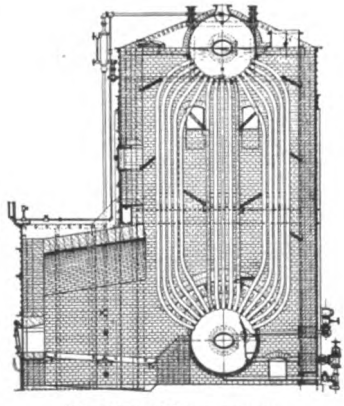
GENERAL OFFICES:
FIRST NATIONAL BANK BLDG., PITTSBURGH, PA.
CHICAGO OFFICE:
518 McCORMICK BLDG., CHICAGO, ILL.

Manufacturers of the Ladd Water Tube Boiler

WATER LADD BOILER

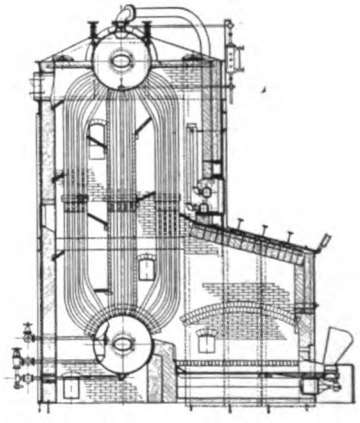
The Ladd Water Tube Boiler is a combination of rugged, simple and accessible construction. It has a clearly defined and unrestricted circulation, properly designed and proportioned gas passages and presents its entire heating surface in an efficient manner to the action of the hot gases. A corollary of the above is economical steam generation both from the standpoint of upkeep and fuel consumption.

There is but one standard of construction: that of the A. S. M. E. Boiler Code. **The drums** provide for ample liberation area, and in the smallest boiler admit of ease in rolling of tubes or inspection. **The tubes** are all bent to a single radius, staggered to the passage of the gases and so arranged that any tube may be removed without disturbing others adjoining. No cast iron parts are used in the construction other than in connection with the brick setting, nor are there any flat or stayed surfaces. Access to the entire boiler is had through swinging manholes in the drums.



Hand Fired Arrangement

The Feed Water is introduced into a separate compartment in the lower drum and from there conducted upward at low velocity through the rear bank of tubes where it is held in contact with the gases in the rear pass for a period of ten to twenty minutes depending on the rate of evaporation. This permits complete sedimentation before the incoming water is brought into contact with the hot gases and insures a temperature practically equivalent to that of the steam before the water enters the circulation proper.



Forced Draft Stoker and Superheater Application

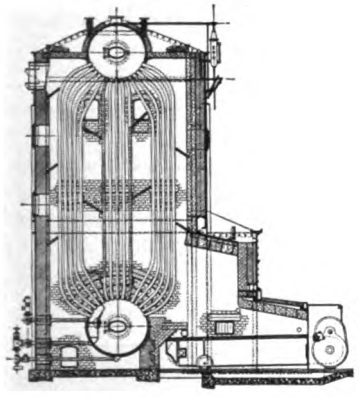
The circulation from this point on is positive and unrestricted, being directly down through the middle bank of tubes into the lower drum, thence upward in the front bank. At no point in the system of circulation is the combined cross sectional area of the tubes less at one point than at another.

The Boiler is suspended or swung in the furnace from heavy pin connections attached to the top drum which transmit the entire weight of boiler and contents to a structural steel supporting frame. This frame lies outside of and flush with the brick setting and carries, beside the boiler, the superheater, all arch thrusts in the brickwork, the stack, if desired, and is available for the support of coal bunker, piping, walkways, etc., or whatever is expedient to attach to the supporting frame. In the Dutch Oven type, the



Digitized by Google

THE GEORGE T. LADD COMPANY PITTSBURGH, PA.

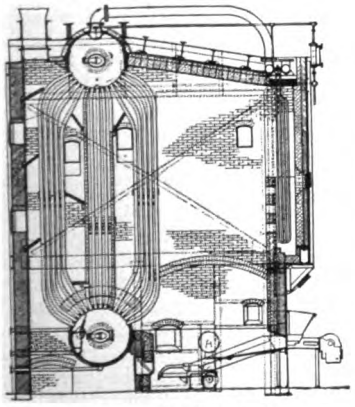


Chain Grate Stoker Application

entire furnace is steel jacketed, the jacket being integral with the supporting frame. Where stokers are used, they are bolted to and held in place by this frame.

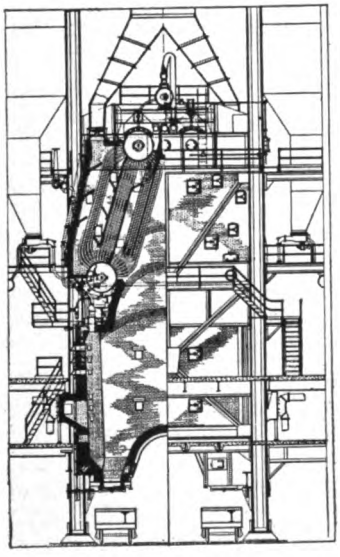
This type of suspension renders the brickwork free from all duty except that of insulation yet confines it so securely as to render it as airtight as brickwork can be made.

Particular attention has been paid to the **baffling** which has been worked out to most efficiently present the heating surface to the hot gases and at the same time prevent shrouding of the tube surfaces. Renewals are quickly and easily made and with reasonable attention, it is proof against short circuit of gases. It is of fire brick construction throughout, no metal binders or clamps being used in the high temperature zones and is tight and lasting for long periods. Any number of passes from two to five, inclusive, may be provided. The baffle system is so arranged that it can be inspected and every tile reached by the operator from some point within the boiler.



Heavy Duty—High Arch Type

While it is impossible to standardize boiler **furnace construction** for all conditions and fuels, the furnace of most general interest is probably that for the burning of bituminous coal over forced draft stokers or powdered fuel. For such service, if the unit is to be subjected to high overloads, the Ladd Boiler is usually equipped with the high arch type of furnace. This furnace promotes



Multi-Drum Type

complete combustion, utilizes the radiant heat to the best advantage, renders the installation smokeless, and is easiest in the heat action on the tubes of any boiler furnace yet designed.

For very large units, the **Ladd Multi-Drum Type** offers all the furnace advantages of the high arch boiler with the additional feature of extremely small external radiating surfaces. **The superheaters** in this type may be carried in the end walls, thus rendering all four sides of the furnace heating surfaces from a point just above the stoker hoppers. This boiler can be made for either three or five pass gas travel.

LADD WATER TUBE BOILERS of the multi-drum type have just been installed in the new power plant erected by the Ford Motor Company at their Detroit plant. The boilers in this installation are the largest that have ever been built, each boiler containing 26,470 square feet of heating surface. The total height of the boiler from the ash pit floor to the top of the superheater piping is 82 feet, 9⅞ inches.

The boilers are fired with a combination of pulverized coal and blast furnace gas—a combination of fuels which to date has produced remarkable operating efficiency.

In range of size, the Ladd Boiler is built from the smallest practical water tube unit up to 1500 H. P. in the Single type and to upward of 5000 H. P. in the Multi-Drum type.

Write for descriptive catalogue and list of prominent users.

Digitized by Google

LEBANON BOILER WORKS

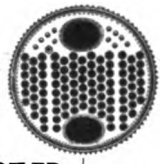
J. K. PETTY & CO., INC., PROPRIETORS

MAIN OFFICE: 6 So. 15TH STREET, PHILADELPHIA, PA.

WORKS: LEBANON, PA.

Selling Representatives in the Principal Cities and Foreign Countries

PRODUCTS:



Designers, Manufacturers and Erectors of Boilers, Superheaters, General Plate Work.

UNIFLOW HIGH EFFICIENCY BOILER:

This modern Return Tubular Boiler is patented in U. S. and Foreign Countries. Authoritative records show that after more than 50 years of universal service there are many more return tubular boilers being made for steam power purposes than any other type of boiler. It has stoically overcome all kinds of abuse.

UNIFLOW RETURN TUBULAR (CIRCULATING) VS. OLD RETURN TUBULAR (CONTRAFLOW):

78 A 60 in. x 18 ft. Uniflow Boiler, while working easier, will develop more horsepower than a 72 in. x 18 ft. Old Return Tubular.

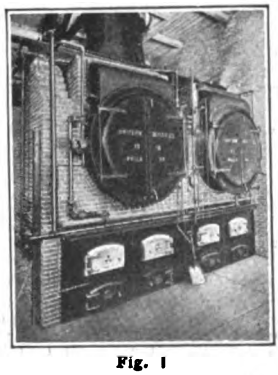


Fig. 1

The two Uniflows shown in Fig. 1 have more capacity than three Old Return Tubular Boilers of the same dimensions. The space left over is reserved for a future Uniflow, although it could be otherwise utilized.

While maintaining the same simplicity of construction and all of the other natural and noteworthy advantages of the time-honored Return Tubular type of boiler, the Uniflow, augmented with its Positive Circulation, secures more H. P. and forges way ahead in compactness, responsiveness, overload capacity, dry steaming, constant water level, efficiency, consistent design, range of sizes and adaptability—all with lower installation, maintenance and operating costs.

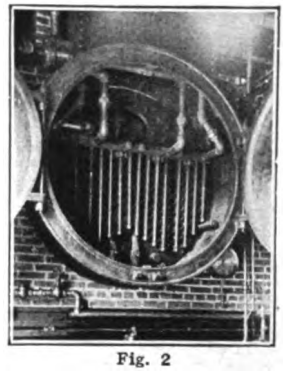


Fig. 2

All Uniflow Boilers operate at 74% or higher efficiency continuously. Old Return Tubular Boilers average 57% (U. S. Government reports).

Uniflow Tubes are 1¼" apart—Old Return Tubulars are 1" apart.

A nozzle for each tube keeps the Uniflow heating surface clean (Fig. 2).

One prominent Uniflow user (a College) writes:—

"Your Uniflow setting has proved to be all that you claimed for it. It is air-tight, no cracks have appeared and it is in as good shape as when first installed, despite some hard usage which the boilers have received."

UNIFLOW RETURN TUBULAR VS. WATER TUBE BOILERS:

Uniflow Return Tubular Boilers are much safer than Water Tube Boilers and contrary claims misrepresent recorded facts. No multiple-ring, butt-strapped Return Tubular Boiler has ever been known to explode, as have Water Tube Boilers by the hundreds.

Uniflow Boilers cost less per horsepower installed, are cheaper and easier to operate and require much less floor space.

Digitized by Google

LEBANON BOILER WORKS — PHILADELPHIA, PA.

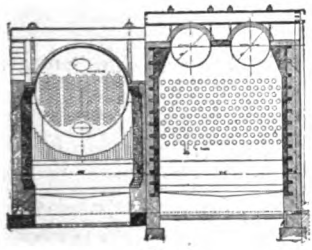


Fig. 3

313 H. P. Standard Uniflow Boiler — 300 H. P. Standard Water Tube Boiler

Uniflow Boilers excel in plain, rugged construction, accessibility for cleaning and repairs, compactness (Fig. 3) and adaptability.

Uniflow circulation is twice its height. Water Tube circulation is twice its height, plus twice its length. Uniflow Boilers are more responsive, maintain a constant water level, do not prime and have no soot losses.

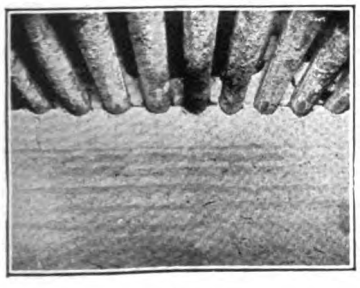


Fig. 4

The outside of water tubes foul with soot and fire scale (Fig. 4) which can never be effectively cleaned off. Consequently Water Tube Boilers test 71 to 74% efficient when new—but after a year's service they operate at from 48 to 65%, due to unavoidable soot losses.

Another well-known thoroughgoing Uniflow user (a Steel Works) writes:—

"We have a 500-horsepower Water Tube Boiler whose full capacity is 3 steam hammers, while our 313 horsepower Uniflow's capacity is 4 steam hammers.

HORSEPOWER RATING OF UNIFLOW BOILERS

Boiler No.	Horse-power	Boiler Dimensions		No. of 3″ Tubes
		Dia.	Len.	
*A-1	134	60″	16′0″	96
*A2	151	60″	18′0″	96
*A3	155	66″	16′0″	111
*A4	174	66″	18′0″	111
A-5	193	66″	20′0″	111
A-6	192	72″	16′0″	140
*A-7	216	72″	18′0″	140
A-8	240	72″	20′0″	140
A-9	230	78″	16′0″	169
*A-10	259	78″	18′0″	169
A-11	287	78″	20′0″	169
*A12	313	84″	18′0″	206
A13	347	84″	20′0″	206
A-14	386	90″	20′0″	256
A-15	428	90″	18′0″	256
A-16	440	96″	20′0″	293
A-17	488	96″	18′0″	293
B-3	50	36″	14′0″	47
B6	67	42″	14′0″	64
B-9	75	48″	14′0″	71
*B-12	102	54″	14′0″	100
*B-15	123	60″	14′0″	121
*B-18	153	66″	14′0″	152
*B-21	181	72″	14′0″	181
B24	214	78″	14′0″	216
B-27	267	84″	14′0″	272

* Denotes stock sizes, 150 lb. working pressure, A.S.M.E. Standard. Other sizes built special.

UNIFLOW PERFORMANCE IS GUARANTEED:

Uniflow saves from 15 to 25% in fuel over both Old Return Tubular and Water Tube Boilers for every year of operation after the first year. Uniflow installations comprehend high efficiency boilers—high efficiency furnaces—smokeless combustion—air-tight settings. They are well adapted to superheating.

The Uniflow stack is designed to last as long as the boiler. It is made self-supporting or guyed and requires no additional floor space.

Uniflow is a simple, standardized design, meeting all conditions of installation, such as low head room; any kind of breeching take-off, side and rear alleys not essential, etc.—but always there is more horsepower, maximum sustained economy for the life of the installation—least maintenance and lower first cost in Uniflow—The Modern Boiler.

Why not put your Boiler proposition up to us?

Digitized by Google

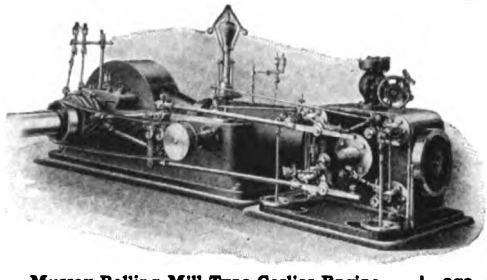
MURRAY IRON WORKS CO.

1870 1921

BURLINGTON, IOWA

Complete Power Plants—Corliss Engines—Boilers of All Types—Air Compressors, Pumping Engines, Feed Water Heaters, Rocking Grates

MURRAY CORLISS ENGINES are built either with girder frame, tangye frames or rolling mill frames of our patented design. *Ask for Catalogue No. 85.*



Murray Rolling Mill Type Corliss Engine

The Standard Murray Corliss is a girder frame engine built in sizes up to 18 x 42 inches, and capacities ranging from 50 to 600 H. P.

Murray Tangye Frame Corliss Engines for extra heavy duty are built in sizes from 16 x 36 inches upward.

Our **Rolling Mill Type Frame** for high pressures and high speeds is built for engines from 12 x 24 inches upwards. Capacities range from 100 to 1300 H. P. Tandem and Cross Compound Engines are built for any load required.

Murray Minor Corliss Engines, 20 to 70 H. P., are suitable for the smaller mills and factories.

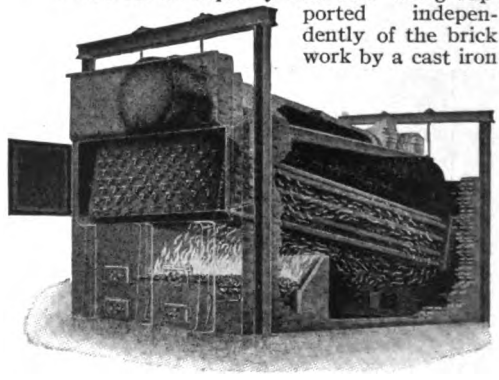
Points of Superiority:

A. Excellence of materials.
B. Best workmanship.
C. Rigid inspection.
D. Superiority of design in the following particulars of detail:

1. The latest and most approved forms of frames, suitable for every purpose.
2. High speed, ball-bearing governor with improved safety stops.
3. A form of cylinder whereby the exhaust passages are insulated from the cylinder by a dead air space.
4. Improved valve motion.
5. Improved dash pots, under the cylinder plate or bolted to side of cylinder.
6. Improved forms of steam and exhaust valves. (Double ported when specified.)
7. An improved form of piston.
8. Fly wheels made in halves, free from initial strains.
9. Vertically adjustable outer pillow block with oil-retaining rim.
10. Broad, pyramidal main bearing and cylinder feet or sole plates.
11. New and improved style connecting rod.
12. Improved cross head with adjustable shoes running in bored guides.
13. Smallest possible clearance volume.

HIGH PRESSURE MURRAY BOILERS:

The essential features of the **Murray Water Tube Boilers** are safety, simplicity, accessibility and economy of fuel and space. They are of the straight tube, all steel type, no cast iron being used in any part subject to tensile strain. They are made up of front and rear headers connected together with wrought circulating tubes and a top steam drum or drums, the whole set with an incline to the rear in an inexpensive brick setting, those of 200 H. P. capacity and over being supported independently of the brick work by a cast iron column and steel girder gallows frame as shown.



Murray Water Tube Boiler with Suspension Rigging

We do not confine our customers to one type, but build the Tubular, the Water Tube and the Internal Furnace. These different types of boilers are described in the following: Water Tube—*Catalogue No. 60;* High Pressure Horizontal Tubular, Standard Horizontal Tubular, Vertical and Portable, *Catalogue No. 90;* "Duplex," *Catalogue No. 75.*

Digitized by Google

MURRAY IRON WORKS CO. **BURLINGTON, IOWA**

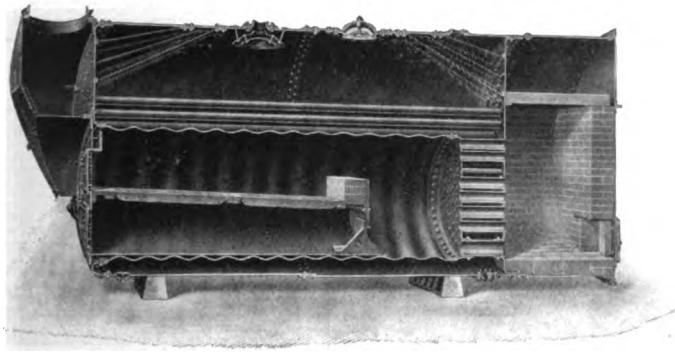


Fig. 1

MURRAY DUPLEX INTERNALLY FIRED BOILERS:

A Different Principle of Circulation

The special feature of the Murray "DUPLEX" boiler is covered by letters patent No. 1,151,127 and this improved form of construction can only be used by the Murray Iron Works Company. The "Scotch" boiler as built heretofore, while nearly the ideal boiler for economy of fuel and space, had one decided weakness, namely, poor and unequal circulation. Owing to the location of the flues and the furnace the heat travels as shown in Fig. 2, and the lower part of the boiler is always cold, so cold, in fact, that in many cases you can safely put your bare hand on the bottom of the shell because all the heat of the fire is transmitted to the water in the upper half of the boiler.

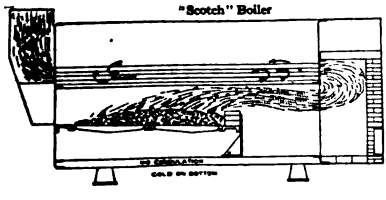


Fig. 2

This unequal heating has two serious drawbacks: first, the water in the lower part of the boiler being dead, only that above the furnace is in circulation, thus materially cutting down the capacity and efficiency of the boiler; second, the extreme difference in temperature between the top and the lower part of the boiler generally causes it to leak in the girth seam.

Fig. 2 correctly represents the fire travel and water circulation in the ordinary types of "Scotch" boilers.

In the Murray "DUPLEX" boiler the circulation is similar to that in an externally fired boiler. Our boiler becomes hot all over setting up a rapid circulation and overcoming all unequal expansion and contraction in the shell and furnace. You would need an asbestos mitten for safety if you placed your hand anywhere on the bottom of our boiler. Note the difference in circulation between a "Scotch" boiler and the Murray "DUPLEX" boiler as shown by Figs. 2 and 3.

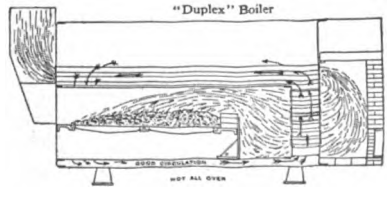


Fig. 3

"DUPLEX" Internally Fired Boilers are built in sizes of 50, 75, 100, 125, 150 200 and 250 H. P.

These Boilers are Practically Smokeless.

Digitized by Google

NEW YORK ENGINEERING CO.

2 RECTOR ST., NEW YORK CITY

THE LUDLUM MARINE BOILER:

The Ludlum Boiler is essentially a marine boiler, designed and built for this specific purpose. It embodies all of the special features demanded in this class of work, including the greatest reliability, economy and steaming capacity, within the smallest limited space and weight.



Style "A" Three-drum Type Ludlum Marine Boiler

Simplicity:

It will be seen at a glance that the Ludlum Boiler is simplicity itself—no screw joints; no headers with their numerous handholes and packed or ground joints together with their restricted passages—no straight tubes anchored into immovable ends or headers with no chance for expansion. The Ludlum Boiler contains no castings; every part is of wrought steel.

Expansion and contraction take place freely in the Ludlum Boiler without straining any one part.

Safety:

The Ludlum Boiler is safest because every part is a true circle. There are no flat surfaces requiring numerous stay bolts and braces. There are no seams or riveted joints exposed to the fire, as they are all outside of the boiler casing, where they can always be observed.

Space Economy:

The Ludlum Boiler occupies less space per square foot of heating surface than any other marine boiler.

Accessibility:

It is a quick steamer, and steam can be raised in less than twenty minutes. The tubes can be cleaned on the inside, if necessary, by the usual methods. All parts of the boiler are accessible, and steam and water drum can be inspected simply by the removal of manhole covers.

Large Units for Rail Shipment:

The Ludlum Boiler can be supplied in larger single units than any other type, thus decreasing the number of boilers required. Moreover, this boiler is usually assembled and completed in our shop, and large units, having from 3000 to 4000 square feet of heating surface, can be readily shipped by rail. The Ludlum Boiler, being shipped in its completely assembled condition, is ready for lowering into the hold of the vessel when it arrives at destination. It is due to this fact that a large amount of time and money is saved. With most other boilers it is necessary that they be shipped knocked down, thus leaving the most important and expensive part of the work to be done in the hold of the vessel. Facilities are provided for attaching the lifting gear to the Ludlum Boiler so that it may be readily lowered into the hold.

This boiler, owing to its large combustion chamber, is adapted to burning coal, oil or wood, equally as well.

This type of boiler has been used in the United States Navy, and has fully demonstrated all of our claims.

The Ludlum Boiler is built in two types, namely, the two-drum and the three-drum. It is readily adaptable to the limited conditions usually encountered in marine work, and it can be varied in detail to meet the most exacting requirements.

Bulletin on application.

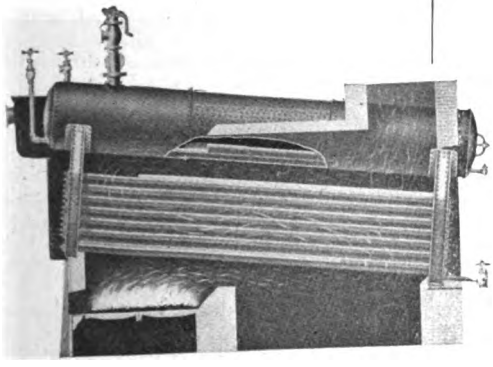
Digitized by Google

JOHN O'BRIEN BOILER WORKS COMPANY

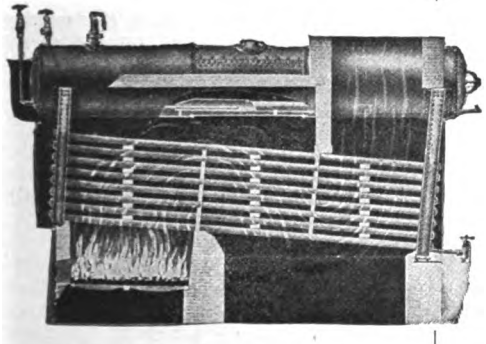
ST. LOUIS, MO.

Manufacturers of Water Tube and Horizontal Tubular Boilers—Originators of the Hawley Down Draft Furnace

FOUR DISTINCT TYPES OF WATER TUBE BOILERS:

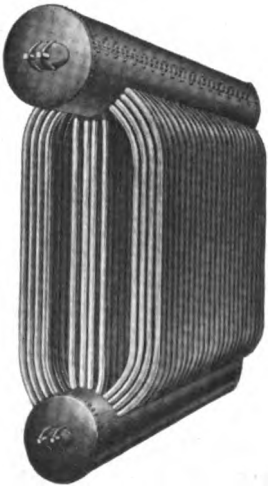


Horizontal Type, baffled for **horizontal pass of gases** with drums parallel with the tubes.



Horizontal Type, baffled for vertical pass of gases, with drums level and tubes inclined.

Cross Drum Type: With drums placed transversely across the boiler. The flues are inclined and the baffle is placed for vertical pass of gases.



Vertical Type: Consists of two horizontal drums, one placed directly above the other and connected by a series of bent tubes.

All headers, or water legs, are made of fire box steel plate, flanged around the edges and joined with wrapper plates, and thoroughly stayed with hollow seamless or solid stay bolts.

Digitized by Google

OIL CITY BOILER WORKS

Established 1876

MAIN OFFICE AND WORKS: OIL CITY, PA.

EASTERN DISTRICT BRANCH: Astor Trust Bldg., Fifth Ave. & 42nd St., New York City
WESTERN DISTRICT BRANCH: Marquette Bldg., Dearborn St., Chicago
PITTSBURGH BRANCH: 1112 House Bldg., Pittsburgh, Pa.
CLEVELAND BRANCH: 705 Rose Bldg., Cleveland, O.

Manufacturers of Pressure and Heating Boilers

PRODUCTS:

"Oil City" Water Tube Boiler—
Standard Type
Cross Drum Type
Vertical Type

"Oil City" Heating Boiler—
Portable Straight Draft Type
Portable Smokeless Type
Brickset Type, Both Straight Draft & Down Draft Types

Horizontal Tubular Boilers—

Vertical Tubular Boilers—

CONSTRUCTION:

All Boilers comply with the A.S.M.E. Code and all State Laws. "Oil City" Smokeless Boilers pass the most rigid Smoke Ordinance.

BOILERS FOR:

Apartments
Churches
Club Buildings
Court Houses
Hospitals
Hotels
Office Buildings
Large Residences
Post Offices
Schools
Central Stations
Cement Works
Compressor Stations
Foundries
Glass Plants
Ice Plants
Industrial Plants
Laundries
Lumber Mills
Mining Power Plants
Municipal Power Plants
Paper Plants
Railway Power Stations
Refineries
Refrigerator Plants
Textile Mills
Traction Power Houses, Etc.

"OIL CITY" WATER TUBE BOILER:

Consists of a bank of straight tubes, expanded at each end into wrought steel headers of box shape, strongly braced and stayed. The tubes are inclined, and the back header is made longer than the front, so that the drum or drums connecting the two headers lie level.

Circulation: The connection of headers with drum is made so as to provide large throat areas. The water flows quietly and steadily, carrying with it the bubbles of steam from the tubes into front header, the inclination of the tubes aiding this and preventing the steam lodging in tubes and forcing the water out with a geyser-like action.

On top of the drum, centrally located, is placed a pressed steel flange for main steam outlet. Inside of this outlet is fitted a perforated Dry Pipe. This arrangement eliminates the use of any internal baffles or deflecting plates.

Numerous tests of "Oil City" Water Tube Boiler installations—many under heavy overload conditions—show entrained moisture in steam to be less than 1%.

Setting: The "Oil City" Boiler is suspended at the front end from heavy overhead cross channels or beams by a heavy wrought iron loop bolt placed under the drum in front of the header and out of the path of the gases. The overhead channels or beams rest on top of steel upright columns which extend down to the foundations. The uprights are placed at extreme outside of setting, removed from the heat of the furnace.

Rear header of boiler rests on rollers, which in turn bear on heavy cast iron plates, firmly supported. This method permits boiler to expand and contract without injury to setting walls.

Sizes: The "Oil City" Boiler is built in a range of sizes from 30 to 1100 Horse Power, and many sizes about the same capacity, but of different dimensions, to meet the varied conditions of space, draft, fuel, furnaces and transportation.

Units up to 420 H. P. are usually built up complete and thoroughly tested before shipment. Units of 500 H. P. and larger are shipped "knocked down."

Digitized by Google

PAGE BOILER COMPANY

GENERAL OFFICES

817 LARRABEE ST., CHICAGO, ILL., U. S. A.

Manufacturers of Water Tube Sectional Steam Boilers

PAGE WATER TUBE SECTIONAL BOILERS:

Greater Boiler Capacity in Less Space

Where high capacity is essential and space is limited, the Page Water Tube Boiler is the ideal steam generator. In construction it is actually two boilers in one; with practically twice the steaming capacity of an ordinary type of boiler of equal size.

The sectional drawing below plainly shows the arrangement of the tube sections which are added to, according to the H. P. desired. Unlike other types of boilers, the Page is a complete self-contained unit, supported by its own steel structure and casings. No brick settings are employed, so that air leakage and heat losses are unknown in Page-equipped plants.

Note the generous combustion chamber and the absence of "baffles," as the term is usually used. The Page is a single pass boiler and attains highest efficiency in one pass because the tubes are short and small—3 inches in diameter for all sizes of boilers—consequently every square inch is constantly active. Scale-forming material and precipitation drop through the lower header into the mud drum where there is no circulation; from there, it is blown out through the blow-off valves. The distance of water travel when passing through the steam drum from one section to another is but 13 inches, as compared with 18 feet of travel in standard and horizontal water tube boilers. Since the tubes are all straight, scale can be quickly removed by turbining. Read the specifications opposite, and send for the Page catalog explaining the many distinctive Page features in detail.

SPECIFICATIONS:

Working pressure up to 300 lbs. (standard construction).

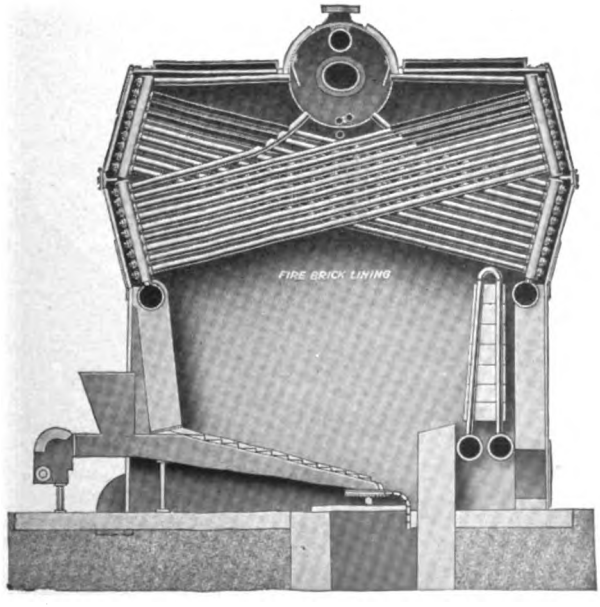
Boilers up to 500 H. P. delivered in sections through an opening 4 ft. by 8 ft.

Equipped with an efficient soot blower; no doors to open when blower is operated.

Requires from 25% to 30% less draft than boilers with several passes, but attains highest efficiency in its one and only pass.

Adapted to all types of furnaces and stokers, or may be hand fired.

Load fluctuations are provided for by a feed water regulator, standard equipment.



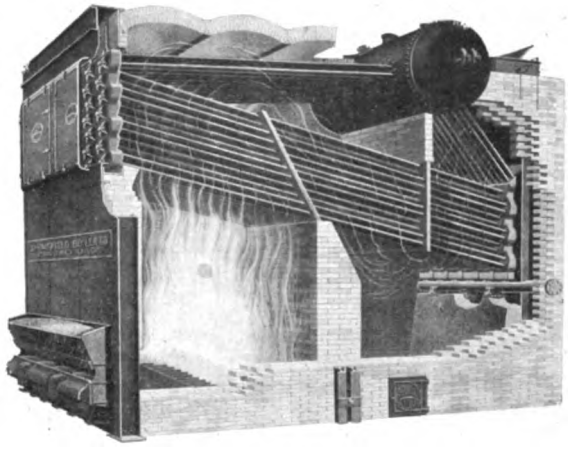
Digitized by Google

SPRINGFIELD BOILER CO.

SPRINGFIELD, ILL.

Builders of "Springfield" Sectional Water Tube Boilers

CHICAGO BOSTON NEW YORK DETROIT PHILADELPHIA RICHMOND PITTSBURGH NEW ORLEANS KANSAS CITY TULSA DENVER SAN FRANCISCO



SECTIONAL

SINUOUS HEADERS

ALL STEEL

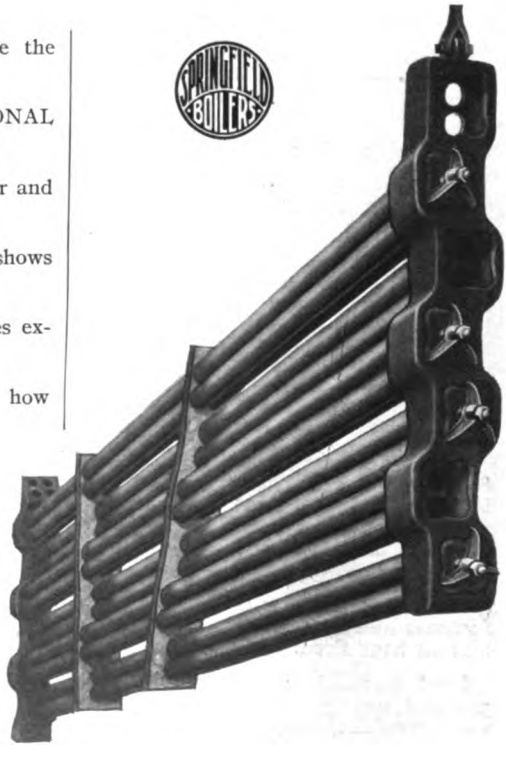
NO STAY BOLTS

NO BENT TUBES

ONE HANDHOLE

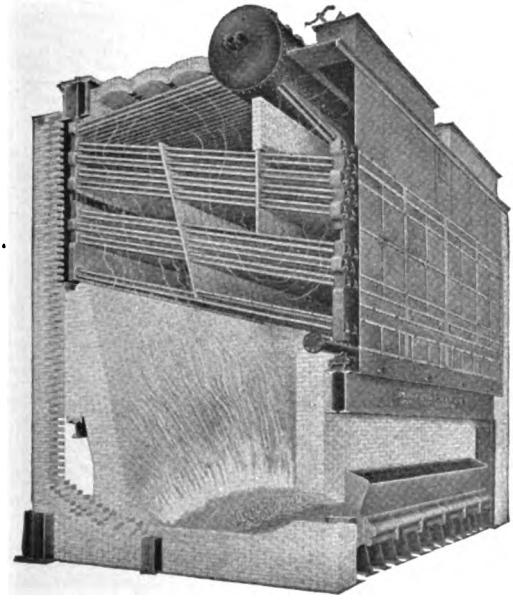
COVERS FOUR TUBES

The cuts on this page illustrate the Standard SPRINGFIELD SECTIONAL ALL STEEL WATER TUBE boiler and one complete header section which shows how it is suspended, how the baffles extend the full height of section, and how *each* handhole covers *four* tubes. Note the simple construction of this boiler and its compactness, which results in low temperature escaping gases and consequent high efficiency.



Digitized by Google

SPRINGFIELD BOILER CO. SPRINGFIELD, ILL.



This cut illustrates a SPRINGFIELD boiler of double-deck drop tube construction; as the SPRINGFIELD boiler is sectional—it is subject to many modifications to meet existing conditions. At the time this book goes to press, we are building two 1505 H. P. boilers, for 300 lbs. working pressure of this construction for the Youngstown Sheet & Tube Co., Youngstown, Ohio, also twelve 1890 H. P. boilers, for 300 lbs. working pressure of very similar design for the United Electric Light & Power Co., New York City.

SPRINGFIELD boilers are of sectional sinuous header and all steel construction. They contain no staybolts or bent tubes, are very compact with tubes spaced to get full benefit of the heated gases which results in low escaping gas temperatures.

As each handhole covers four tubes there are only one-third the number of handholes required by other water tube boilers of like capacity. SPRINGFIELD boilers contain many other interesting and valuable features.

Built in sizes to 3000 H. P. and working pressures to 500 lb.

Many of the largest power users and leading engineers are adopting SPRINGFIELD boilers after experience or thorough investigation.

Write for catalog and further details.

SEE OUR ADVTS. IN MECHANICAL ENGINEERING THE JOURNAL OF THE A.S.M.E.

OFFICES:

Chicago	Boston	New York
Philadelphia	Detroit	Pittsburgh
Kansas City	Richmond	Tulsa
New Orleans	Denver	San Francisco

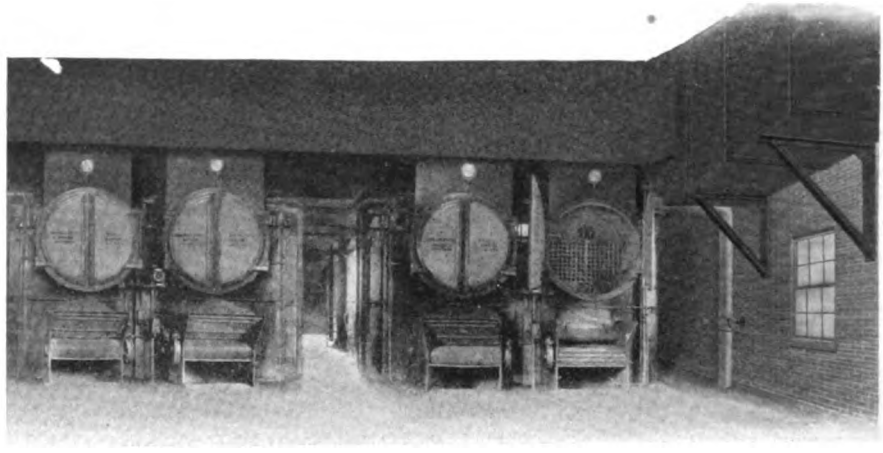
Digitized by Google

SAMUEL SMITH & SON COMPANY

PATERSON, N. J., U. S. A.

Established 1844 Cable "SAMSMITH"

Manufacturers of Horizontal Return Tubular and Smith Vertical Tubular Boilers



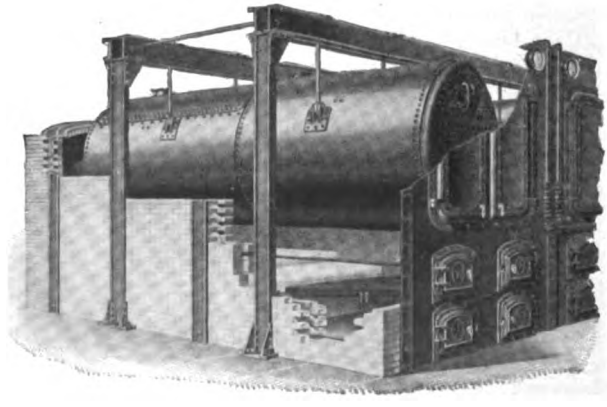
Builders of:

HORIZONTAL TUBULAR BOILERS
SMITH VERTICAL BOILERS
BLEACHING KIERS
STEAM BOXES
SMOKE STACKS & BREECHINGS
HEAVY PLATE WORK

Boilers built to A.S.M.E. Code Standard or to State Codes.

Tubes, Grate Bars and Boiler Fittings carried in stock for immediate shipment.

Our Engineering Department is at your service to aid in your problems.



Digitized by Google

TITUSVILLE IRON WORKS CO.

TITUSVILLE, PA.

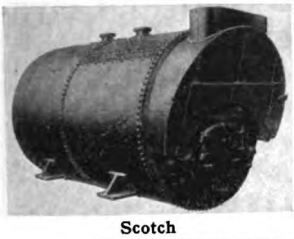
NEW YORK OFFICE
90 West Street

BUFFALO OFFICE
821-23 Marine Trust Bldg.

PITTSBURGH OFFICE
Farmers Bank Bldg.

Manufacturers of Firetube Steel Boilers for Power and Heating; Fronts, Grates, Castings, Smoke Stacks, Tanks and Oil Well Boilers; Steam, Gas, Oil and Gasoline Engines; Pumping Powers and Oil Well Machinery.

Send for our 94 page Catalog No. 81 describing Titusville Boilers and Machinery.



Scotch



Vertical



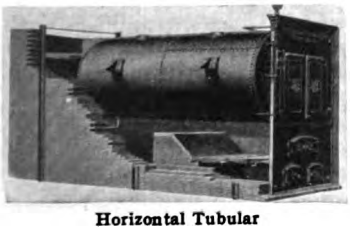
Tico Smokeless



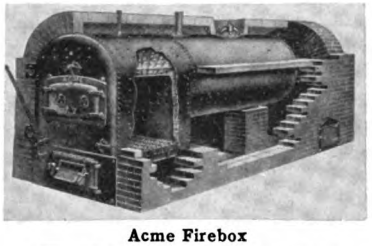
Tubeless Water Heater



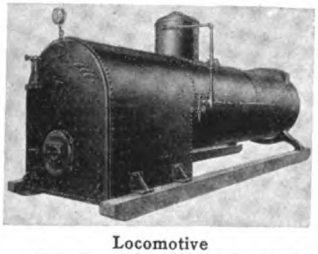
Tico



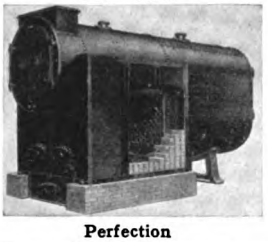
Horizontal Tubular



Acme Firebox



Locomotive



Perfection



Perfection Smokeless



Acme Smokeless

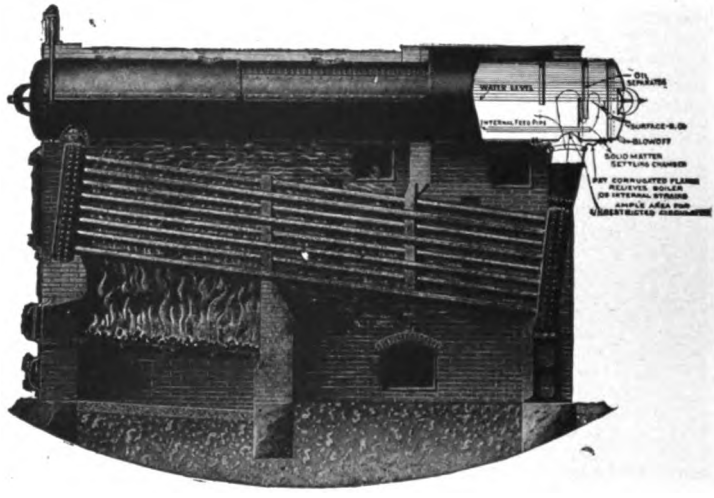
Digitized by Google

UNION IRON WORKS

ERIE, PA.

Manufacturers of Steel Boilers

Branch Offices and Representatives in Boston, New York, Philadelphia, Syracuse, Buffalo, Cleveland, Pittsburgh, Toledo, Detroit, Chicago, St. Louis, Kansas City and San Francisco



The Union Iron Works have been builders of steel high-pressure steam boilers for nearly 30 years in Erie. From a modest start we today cover about six acres with buildings consisting of main boiler shop, flange shop, blacksmith shop, machine and casting shop, stack and tank shop. All of these buildings are equipped with modern facilities. See feature No. 7. Our motto "Quality" accounts for our growth and development.

No effort is spared to keep the product up to and ahead of the times if possible by an expert engineering staff.

THE "UNION" WATER TUBE BOILER:

1. Horizontal drums—liberating surface, dry steam, water storage capacity.

2. Purifier in drums, settling chamber out of fire and circulating element, oil trap, provided with blow-off connection. Additional blow-off bottom of headers.

3. Corrugated flange connection from drums to headers, no restricted area, good circulation, relieving boiler of internal strains.

4. Headers made in integral halves in one heat, of ample depth, no double plates or rivets exposed to fire; regular, not irregular, pitch of staybolts.

5. Handhole plates of steel plate, each removable through hole it covers, no fishing, yoke of novel design, quickly removed. Special shape of handhole, easily kept tight.

6. Greater inclination of tubes promoting circulation, vertically staggered, horizontal spacing to permit proper cleaning on fire side. Ample gas passage areas.

7. The very best workmanship that can be done by a well-trained organization.

8. Continued operating efficiency and greater overload capacity than any other boiler, due to the combination of these features, resulting in less time required to clean boiler when necessary, longer period of continued efficient operation, minimum loss of time out of service.

We also build a complete line of **Fire Tube Boilers** and do **steel plate work.**

Condensed specifications and engineering data specially prepared for consulting and designing engineers, free on request.

SEE OUR ARTICLE MECHANICAL ENGINEERING

Digitized by Google

THE WALSH & WEIDNER BOILER CO.

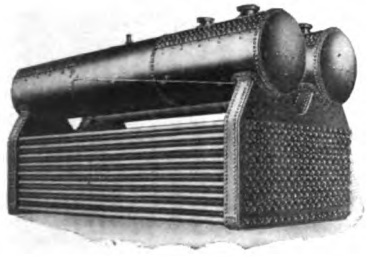
FACTORY AND GENERAL OFFICES

CHATTANOOGA, TENN.

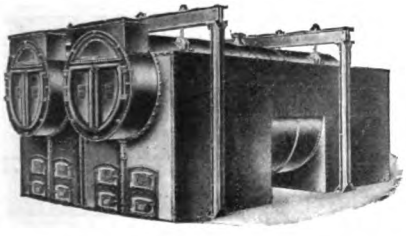
BRANCH SALES OFFICES—NEW YORK—NEW ORLEANS—MEMPHIS—HAVANA

Manufacturers of Boilers, Tanks and Towers, Storage Tanks, Structural Steel and Steel Plate Work of Any Description

HORIZONTAL RETURN TUBULAR AND WATER TUBE BOILERS:



With or without steel casing setting. Special furnaces for all kinds of fuels or refuse materials.



The steel casing setting may be used either with tubular or water tube boilers and is of great value in preventing infiltration of air into the furnace—thus saving considerable fuel as compared with boilers set in the ordinary brick setting.

The steel casing setting is neat looking, occupies less space than the brick setting, and the cost of installation is not materially greater.

SEE OUR ADVTS. IN MECHANICAL ENGINEERING THE JOURNAL OF THE A.S.M.E.

TOWERS AND TANKS:



Pressure and storage tanks, steel riveted piping and other work for by-products plants, chemical plants and all kinds of industrial work. Oil storage tanks, stills and agitators. Sugar crystallizers and defecators.

PLATE IRON WORK: STRUCTURAL MATERIAL:



All kinds of special plate iron and structural work.

Digitized by Google

THE CHARLES WARD ENGINEERING WORKS

CHARLESTON, W. VA.

EASTERN AGENT
KEARFOTT ENGINEERING CO., INC.
95 Liberty St., NEW YORK CITY

PACIFIC COAST AGENT
MCKINLAY ENGINEERING BUREAU
Chamber of Commerce Building
PORTLAND, OREGON

Manufacturers of Water Tube Boilers and Marine Engines
Light Draft River Steamers, Steel Barges, etc.



WARD'S WROUGHT STEEL MARINE BOILER:

Improved and Most Rapid Circulation.

Generating Tubes Expanded.

No Other Joints.

No Nipple Connections.

No Staybolts.

SEE OUR ADVTS IN MECHANICAL ENGINEERING THE JOURNAL OF THE A.S.M.E.

Illustration shows Ward Boiler of 4275 Square Feet Heating Surface.

Contracts Awarded as Result of Evaporative Trials.

16.73 Pounds Water per Pound of Oil.
81.68 Per cent Efficiency.

Built in 60 standard sizes, ranging from 1700 to 5000 S. F. H. S.

Especially for Marine and Stationary Work where Highest Efficiency is required.

Digitized by Google

THE WICKES BOILER CO.

SAGINAW, MICHIGAN

Manufacturers of Water Tube and Return Tubular Boilers

SALES OFFICES

NEW YORK, 1716 West St. Bldg.
BOSTON, MASS., 201 Devonshire St.
SEATTLE, WASH., 736 Henry Bldg.
PITTSBURGH, PA., 1218 Empire Bldg.
DETROIT, MICH., 1116 Penobscot Bldg.
CHICAGO, ILL., 76 West Monroe St.

PRODUCTS:

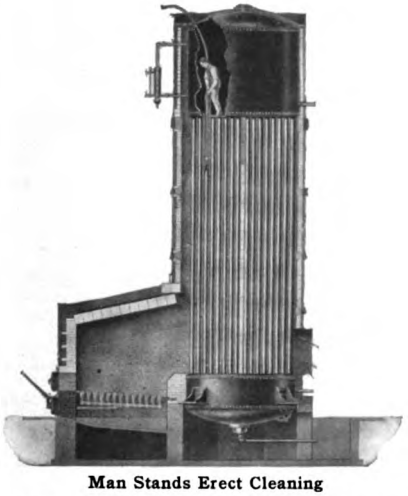
Wickes Vertical Water Tube Boilers.
Horizontal Return Tubular Boilers.

WICKES VERTICAL WATER TUBE BOILERS:

Designed and built in accordance with the A. S. M. E. Code.



Steel Cased Settings Stop Air Leaks and So Save Coal.



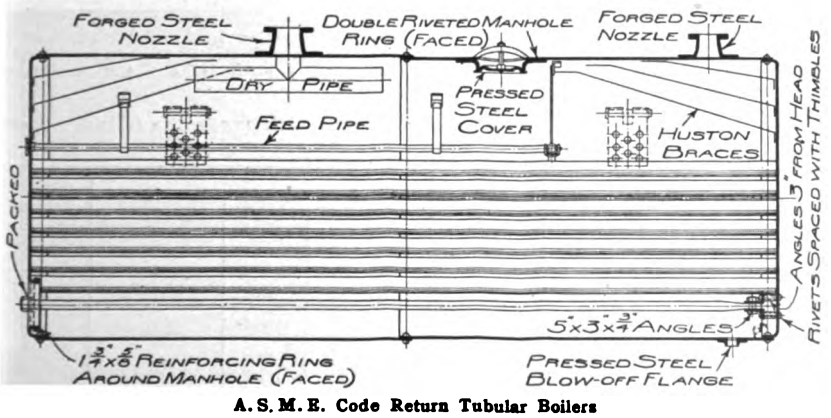
Man Stands Erect Cleaning

Two men can open, wash, close and fill the WICKES in five hours. Turbine in ten hours.

Our technical, educational bulletins, pointing out the way to greater economies in boiler room practice, are yours for the asking. Send for them.

SEE OUR ADVTS. IN MECHANICAL ENGINEERING THE JOURNAL OF THE A.S.M.E.

HORIZONTAL RETURN TUBULAR BOILERS:



A. S. M. E. Code Return Tubular Boilers

Ask or "The Truth About Horizontal Return Tubular Boilers," covering design and workmanship.

Digitized by Google

THE SMITH GAS ENGINEERING CO.

DAYTON, OHIO

Factories:
Dayton and Lexington, Ohio

Sole Canadian Representatives:
Canadian Allis-Chalmers, Ltd., Toronto

Manufacturers of Smith Cleaned Gas Producer Plants

SMITH GAS PRODUCERS:

Producer gas in the cold cleaned state is rapidly forging ahead as most efficient and economical for power service and for industrial heating.

FOR POWER:

With Cold Cleaned Producer Gas, continuous gas engine operation is assured by the uninterrupted supply of a high quality of cleaned producer gas exactly suited for gas engine work. Engineers are beginning to realize that the modern gas producer plant is just as dependable as the steam plant. Smith Producer plants of every size and for burning all grades and kinds of coal where fires have not been drawn for years prove this conclusively.

When used in connection with the gas engine, Cold Cleaned Producer Gas furnishes the cheapest source of power known.

FOR HEATING:

Cold Cleaned Producer Gas is easily applied to the heating of furnaces and ovens with marked economy over other fuels. Plants to furnish gas for melting, annealing, heat-treating and reheating metals and glass, for enameling ovens, for baking and drying, and for use in foundries are demonstrating daily the superiority of producer-gas in these fields. Cold Cleaned Producer Gas can be served to any furnace any distance from the producer plant through ordinary steel pipe. Its use permits centralizing the producer plant—one plant—one man responsible for it—one coal and ash handling problem—one dependable fuel source. It can be effectively controlled to produce any temperature or furnace condition.

TYPE "BF" PRODUCER:

Operates on bituminous and lignite. By the use of the Type "F" Tar Extractor gas 99.5% cleaned can be obtained. Engines are operated continuously for long periods upon gas cleaned in this way and no trouble whatever is experienced from the accumulation of tar in the manifolds or valves.

TYPE "G" MECHANICALLY OPERATED PRODUCER:

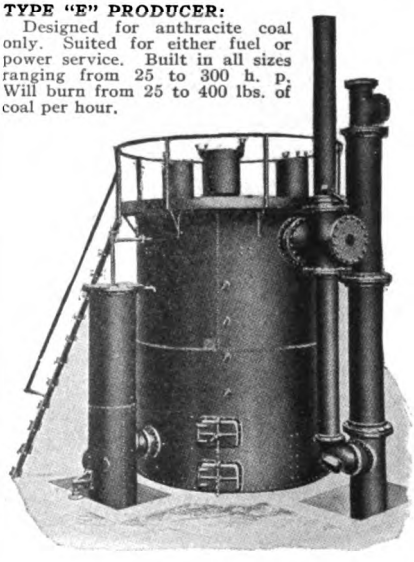
Type "G" is a high-duty, mechanically operated bituminous producer, designed to meet the demand for large gas capacity and low labor costs. A steam operated poker gives more thorough distillation and a resulting higher efficiency. Made in sizes of 9 to 16 feet diameter with capacities of 800 to 3000 pounds of coal per hour.

TYPE "EP" PRODUCER:

For charcoal or coke made in same sizes and capacities as Type "E."

TYPE "E" PRODUCER:

Designed for anthracite coal only. Suited for either fuel or power service. Built in all sizes ranging from 25 to 300 h. p. Will burn from 25 to 400 lbs. of coal per hour.



300 H. P. Type "E" Producer

The Smith Gas Engineering Company will be pleased to mail bulletins describing the different types of producers and the producer-gas theory.

The great economy obtained with Cold Cleaned Producer Gas is shown by this table of relative operating costs of 200 H. P. steam and gas power plants:

Type of engine	Fuel	Cost per ton	Fuel consumption per b. h. p. hour, lbs.	Total coal, tons	Total fuel cost per year of 3000 hours	Relative fuel costs, per cent
Simple steam....	Bituminous coal	$6.00	8	2400	$14,400.00	640
Compound steam non-condensing	Bituminous coal	6.00	5	1500	9,000.00	400
Compound steam condensing....	Bituminous coal	6.00	3	900	5,400.00	240
Producer gas....	Anthracite coal	10.00	1	300	3,000.00	133
Producer gas....	Lignite	5.00	1.75	525	2,630.00	117
Producer gas....	Bituminous coal	6.00	1.25	375	2,250.00	100

Digitized by Google

AMERICAN CHIMNEY CORPORATION

147 FOURTH AVE., NEW YORK

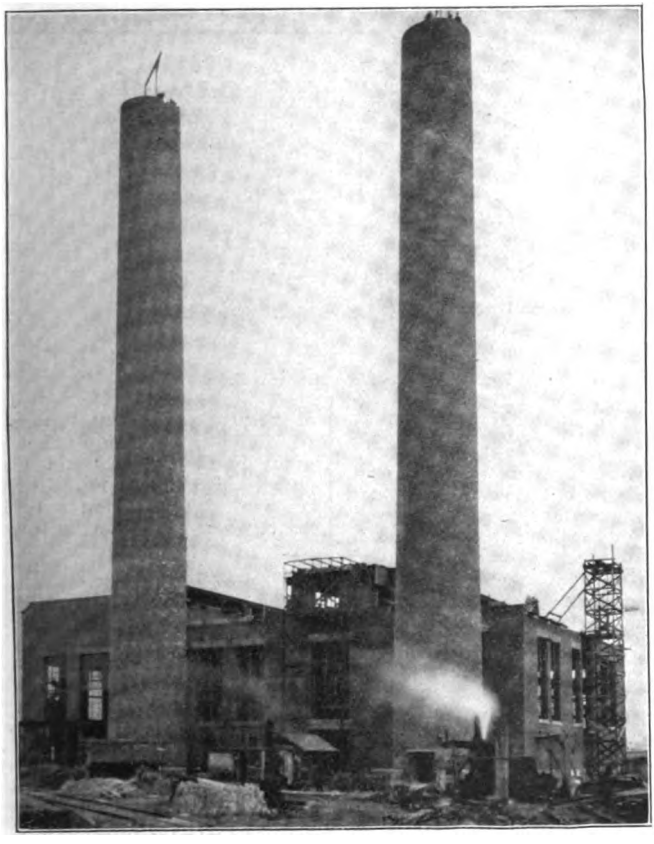
Designers and Builders of Chimneys

BRANCH OFFICES

141 Milk Street
BOSTON

Stephen Girard Bldg.
PHILADELPHIA, PA.

919 Ulmer Bldg.
CLEVELAND, OHIO



RADIAL BRICK CHIMNEYS:

The radial brick chimney possesses many advantages over other types of chimneys.

It is constructed of special bricks which are perforated and are shaped to the circular and radial lines of the chimney, producing when in place smooth and true inner and outer surfaces.

The perforations in the brick permit a thorough burning.

In the wall they form insulating dead air spaces which reduce radiation, resulting in great fuel economy.

The mortar extends partly into the perforations thoroughly keying the bricks together and adding greatly to the stability of chimney.

The bricks are made in units larger than common bricks and the number of the joints (the weakest parts in the chimney) is thus greatly reduced.

The bricks are so dimensioned that an effective bond is obtained tangentially.

Digitized by Google

THE GREEN FUEL ECONOMIZER CO.

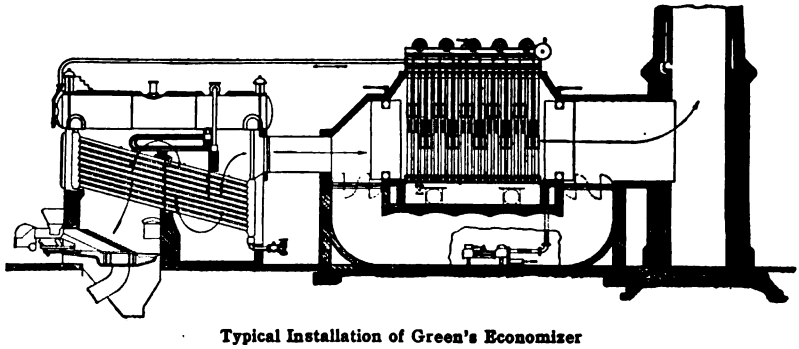
BEACON, N. Y.

GENERAL SALES OFFICE, BEACON, N. Y.

CHICAGO BOSTON PHILADELPHIA PITTSBURGH CLEVELAND ATLANTA SAN FRANCISCO
ST. LOUIS LOS ANGELES SEATTLE SALT LAKE CITY KANSAS CITY TUCSON HONOLULU

Assoc'd with GREEN'S ECONOMIZER, LTD.: TORONTO, MONTREAL, WINNIPEG, VANCOUVER
E. GREEN & SON, LTD.: WAKEFIELD, ENGLAND

Builders of Green's Economizers; Green's Steel Plate Fans; Green's High-efficiency, High-speed Radial Flow Fans; Mechanical Draft Installations



Typical Installation of Green's Economizer

GREEN'S FUEL ECONOMIZER:

96 The economizer consists of a number of cast-iron tubes and headers through which the feed water passes on its way to the boiler and around which the waste gases of combustion pass on their way to the stack. Its purpose is to heat the feed water under boiler pressure to a high temperature by means of the heat contained in the flue gases when they leave the boiler. It employs the "counter-current" or "multi-stage" principle of heat transmission applied to steam generation.

The function of the boiler is to absorb from the gases of combustion, the heat required for vaporization and to provide for the separation of the steam from the water. The economizer, however, absorbs heat economically from the flue gases, thus raising the temperature of the feed water to a point where the boiler functions only as a steam generator and not as a feed water heater. The result of this is either a decided fuel saving or an increase in the boiler capacity for the same amount of fuel. The economizer itself costs less, square foot for square foot, and is subject to a lower annual percentage for upkeep and depreciation than is the boiler.

As ordinarily sold the economizer reduces the flue gas to a final temperature of 300° to 350° F. and pays from 40% to 100% interest on the investment, annually depending upon the operating and local plant conditions. The percentage of fuel saving may be approximated from the following formula:

$$\text{Percentage Saving} = \frac{100(T - t)}{(H + 32) - t}$$

where T = Temperature of feed water after heating.
t = Temperature of feed water before heating.
H = Total heat in steam above water at 32° F.

The following is a rough rule for determining the sizes. Allow about 5 square feet of economizer heating surface per rated boiler horsepower.

The 9′ tube has 12.75 sq. ft. heating surface
The 10′ tube has 13.96 sq. ft. heating surface
The 11′ tube has 15.17 sq. ft. heating surface
The 12′ tube has 16.38 sq. ft. heating surface

The standard sections are 4–6–8–10 and 12 tubes wide with tubes 9′–10′–11′ and 12′ long and are built up in multiples of four sections.

Height over sections (9′ tubes) 10′ 2¼″
Height over gearing (9′ tubes) 13′ 5¼″

(Increase above 1 ft. for each 1 ft. increase in tube length over 9 ft.)

Length of one multiple of 4 sections 2′ 5″.

Our Engineering staff will be glad to coöperate with you in any detail of your requirements. **Write for our Bulletin No. 151.**

THIS ECONOMIZER is especially adaptable in connection with waste heat installations.

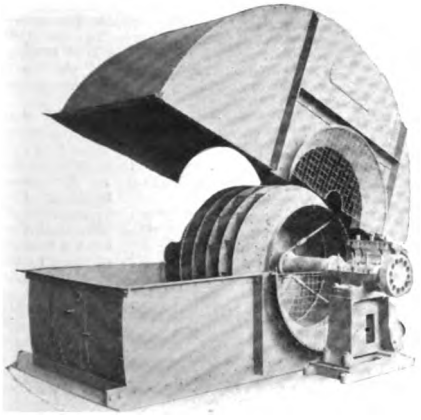
Digitized by Google

THE GREEN FUEL ECONOMIZER CO. BEACON, N. Y.

GREEN'S FANS:

The Green Fuel Economizer Company specializes in the manufacture of fans of the most approved type, for all mechanical draft service.

RADIAL FLOW FANS:



Green's "RB" Radial Flow Fan

Greens Radial Flow, Hi-speed, Hi-efficiency Fans are manufactured in two types: "RB" and "RR" for forced draft and induced draft service, respectively. These fans are exceptionally well suited to modern Power Plant service, having been designed primarily for this duty. They are built of very heavy steel plate and wheels are mounted on heavy forged steel shafts and supported by extra large bearings, rigid ring oiled type, using the best grade babbitt. Each bearing mounted on independent pedestal with sole plates, on single inlet fans, the wheels are overhung and the shaft is supported by two bearings, mounted on a cast-iron base-plate, bearings are water cooled for induced draft service. The housings are large, well braced and stiffened for high pressure. A labyrinth seal has been devised to prevent the blow back of air through the inlet.

The capacity of standard fans runs from 1600 CFM to 275,000 CFM and from 1″ to 7″ inclusive, WG.

Due to the design of these fans, they are particularly adapted to high speed work and are therefore suitable for direct connection to turbine or motor running at the most efficient speed for these drives, thus, one gets a small, compact highly efficient fan unit. The fans themselves save 10% to 15% of the H. P. usually necessary for this class of work. In addition to this feature, the "RB" fans have a non-overloading power curve, which means absolute protection to driving motors.

We would be pleased to figure on your special requirements. Our bulletin No. 152 describes and illustrates the **"RB" Radial Flow Fans,** giving capacity tables and outline dimension drawings.

STEEL PLATE FANS:

These fans are used for all kinds of mechanical draft service, forced, induced, ventilation, etc., and are built with single or double inlet as the conditions may demand. They are made of heavy steel plate, the housing is reinforced and stiffened by angles, wheels are strengthened to withstand high pressures and medium speeds, the shafts are extra heavy and operate in rigid type ring oiled bearings, using the best grade babbitt. Where fans are used for handling hot gases, bearings are water cooled. On single inlet fans, where the wheel is overhung, two bearings are used with the center of gravity of the wheel as close as possible to the inner bearing. The standard steel plate fans are built with wheel diameters from 1½′–16′ and larger in special cases.

Our catalogue No. 127 will prove instructive. It contains tables and outline dimensions of all sizes of fans. We will be pleased to forward you a copy of this booklet.

SEE OUR ARTICLE IN MECHANICAL ENGINEERING THE JOURNAL OF THE A.S.M.E.

Digitized by Google

THE SUPERHEATER COMPANY

(Formerly Locomotive Superheater Co.)

GENERAL OFFICES: 17 EAST 42ND ST., NEW YORK

BOSTON: 79 Milk St. CHICAGO: Peoples Gas Bldg. PITTSBURGH: Union Arcade Bldg.

For CANADA: The Superheater Co., Ltd., Transportation Building, Montreal

Designing Engineers and Manufacturers of ELESCO Steam Superheaters and Pipe Coils for all purposes and Boiler Feed Pumps

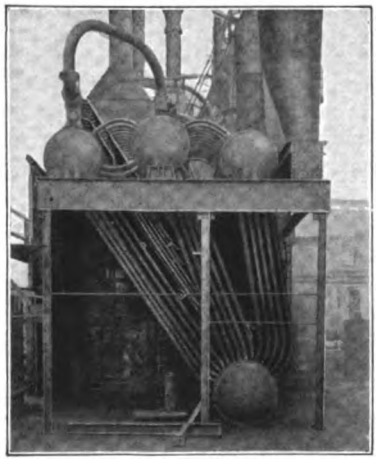
PRODUCTS:

ELESCO Superheaters for all types and sizes of Stationary boilers; separately fired superheaters for all purposes; superheaters for locomotive and steam shovels; superheaters for marine service—Pipe coils and Elesco Super coils, for all purposes.

ENGINEERING SERVICE:

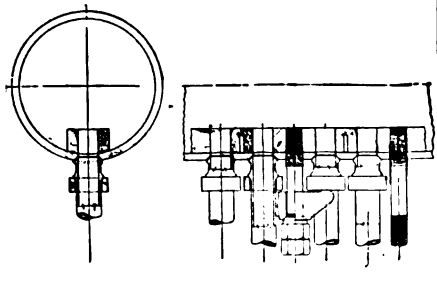
The Engineering Department of this company is at the service of those interested in the advantages or application of superheated Steam.

ELESCO SUPERHEATERS:



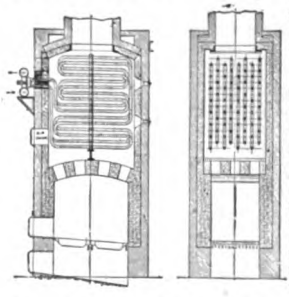
Elesco Superheaters are suitable for all types of boilers without changes to the boiler setting. They reduce fuel consumption, increase boiler efficiency, reduce condensation in steam lines, reduce steam consumption in engines and turbines, increase the capacity of the plant.

Their design and construction provides freedom from leaks, ease of application and accessibility for inspection and repairs, and maximum length of service without renewal.



The Elesco Superheater consists in general of two headers, one acting as the distributor for the saturated steam, coming from the boiler, and the other as a "Superheated" header for collecting the steam after it has been superheated, and the necessary connecting units in which the actual superheating takes place. The headers are made of steel and located out of the path of the hot gases, and in most cases, outside of the boiler setting proper, affording easy access for inspection and cleaning.

Units are of heavy cold-drawn seamless steel tubing located in the advantageous gas temperatures, giving a large ratio of superheating surface, an even distribution to the flow of the gases, and a proper distribution to the steam through the superheater. The units present a smooth surface to the gases tending to prevent an accumulation of soot and ashes, and are thus easily cleaned. Because of their small diameter and proper distribution they offer a minimum obstruction to the gases.



A metal to metal ball joint forms the connection between the units and the headers, giving a positive tight joint, and avoids the use of hand holes and gaskets.

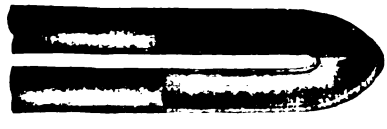
SEPARATELY FIRED SUPERHEATERS:

This company designs and manufactures separately fired superheaters, for all purposes and for process work, for pressures from atmospheric up to 1000 lbs. per sq. in. and for temperatures up to 1000° F. The special features of accessibility, regulation, long life and high efficiency are incorporated in these designs.

SUPERHEATERS FOR STEAM SHOVELS:

Elesco Superheaters, easily installed in steam shovels, reduce fuel consumption at least 25%. At least as high a saving in water is also possible.

ELESCO PIPE COILS:



The coils are designed and manufactured to practically any specifications, for any purpose. The feature of these coils involving a return bend is the patented forged return bend which results in a coil of practically a continuous pipe, without threaded or acetylene welded joints; greatest surface within a given space possible; absolutely leak proof.

Full descriptive literature on all ELESCO products

Digitized by Google

GLASGOW IRON COMPANY

POTTSTOWN, PENNA.

PHILADELPHIA
603 Harrison Bldg.
15th & Market Sts.

NEW YORK
A. B. MURRAY CO., INC.
88 Washington St.

BOSTON
HARRINGTON, ROBINSON & CO.
Sargent Bldg.

Manufacturers of All Grades of Iron and Steel Plates

FLANGED and DISHED BOILER HEADS.

Flanged Manholes—Handholes and Flueholes.

ROE STAMPED STEEL MANHEAD and YOKE.

Standard and Heavy Threaded Pipe Flanges. Companion Flanges—Off Center Pipe Flanges.



MANHOLE SADDLES.

BUCKLED PLATES.

ROE BOILER LUGS.

RECTANGULAR FLANGED HEADS.

WELDING AND CUTTING with the OXY-ACETYLENE TORCH.

Pressed Steel HOT BLAST VALVES and VALVE SEATS, Patented.

BOSH COOLING PLATES—TUYERE COOLERS.

FORMING, CUTTING OUT, PUNCHING and BENDING Plate to order.

Bending and Forming ANGLES and SHAPES.

The GLASGOW FLAT FLANGES for Riveted Pipe.

Pressed from Steel Plate—For Any Service.

Made PLAIN or BORED, FACED, HUB BEVELLED, DRILLED, to order. Any thickness of plate. 6 ins. to 72 ins. INSIDE DIAMETER.

These FLANGES, made with wide flanges, make Excellent Expansion Joints for Pipe Lines.

Many shapes formerly made in expensive Bronze Castings can now be made from Steel Plate by Press Work in combination with AUTOGENOUS WELDING.



Correspondence Solicited.

Digitized by Google

KEY BOILER EQUIPMENT COMPANY

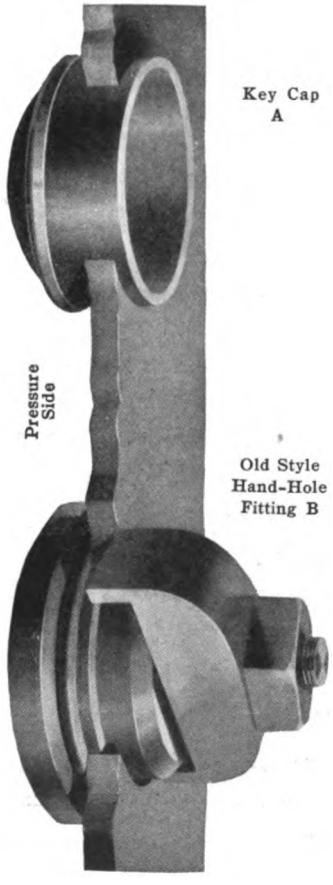
Incorporated

27TH AND MCCASLAND AVE., EAST ST. LOUIS, ILL.

Manufacturers of Safety Hand-Hole Caps and Tools

KEY SAFETY HAND-HOLE CAPS:

Over 4,000,000 in service
Note comparison

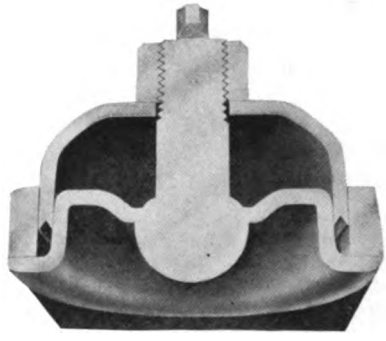


A. Key cap one piece, no gasket required, self tightening, non-leaking; saves time, labor, money, fuel, personal injuries, property damage, consequential loss and adds greater efficiency.

Key cap will sustain a pressure load in excess of 3000 pounds per square inch.

B. Old style hand-hole plate—5 pieces. Joint made on plate necessitates use of gasket.

KEY "SPECIAL" HAND-HOLE PLATE:



Two patents pending.

This plate enters its own hole—no screw threads or gaskets.

Impossible to blow out.

Removed in 20 seconds and reinstalled complete in 25 seconds.

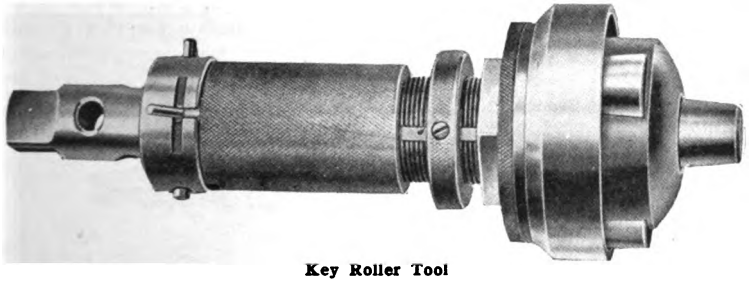
No special tool equipment necessary.

Used in high pressure oil stills, locomotive boilers, down draft furnaces, heating boilers and any and all kinds of equipment necessitating hand hole plates or screw plugs.

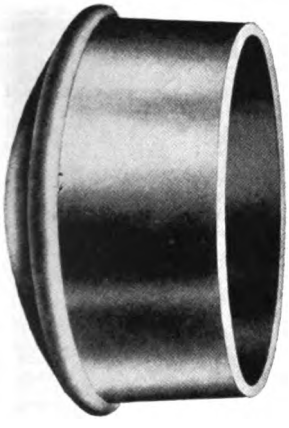
Adapted to the curved surface of any diameter drum from 3 inches up. Manufactured in all sizes, from 1 inch up.

Digitized by Google

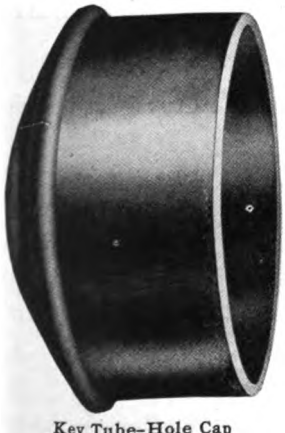
KEY BOILER EQUIPMENT COMPANY E. ST. LOUIS, ILL.



Key Roller Tool



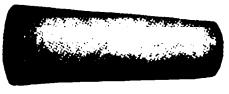
Key Hand-Hole Cap
Tapered Side



Key Tube-Hole Cap
Straight Side



Key Ratchet
Wrench



Key Stay-Bolt Plug



Key Pick-Up Tool

KEY HOT JOINT PASTE:

For gasket joints, screw thread pipe joints, locomotive front end doors, and all hot joints.

Will stop all leaks in your power plant.

Insurance against deterioration, rust and corrosion resulting from leakage.

Perfected non-corrosive filler—no oil or oxidizing ingredients used.

Packed in 3 lb., 5 lb., and 10 lb. cans, half barrel and barrel lots.

Digitized by Google

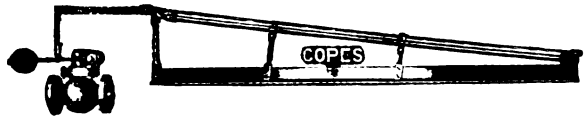
NORTHERN EQUIPMENT COMPANY

MAIN OFFICE AND WORKS: ERIE, PA.

BRANCH WORKS: MANCHESTER, ENGLAND; PARIS, FRANCE; HAMILTON, ONT., CANADA; COLOGNE, GERMANY.

Representatives in All Principal Cities throughout the World

Manufacturers of Copes System of Feed Water Control



METHOD:

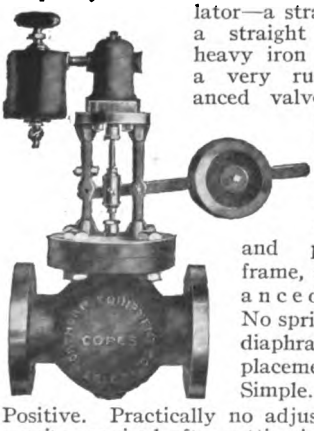
The regulator feeds continuously as long as there is a load on the boiler. On heavy loads the water level is lowered so as to increase the steaming capacity. On light loads the water level is gradually raised, thus utilizing furnace heat which would otherwise be wasted. On steady loads, it maintains a constant water level.

Every Copes Regulator is designed for the specific conditions governing each boiler.

The governor maintains a constant differential between steam pressure and pump discharge pressure.

CONSTRUCTION:

A glance at the illustrations show the simplicity of construction. The regulator—a straight tube, a straight lever, a heavy iron base, and a very rugged balanced valve that is practically frictionless. The governor—a cylinder and piston, a frame, and a balanced valve. No springs, floats, diaphragms or displacement bodies. Simple. Direct. Positive. Practically no adjustments or repairs required after cutting into service. Negligible repairs. Many have been operating daily for 20 years.



RESULTS:

Gives higher overload capacity. Removes unreliable human element from water control.

Eliminates danger while new employees are being "broken in."

Saves fuel—4% to 8% or more.

Even distribution of load between boilers.

A rate of feed that produces scientifically correct steam and water meter charts.

Smaller feed lines and valves.

More even load on feed pump.

Dry steam, since the water level cannot exceed a predetermined level and because the level is a minimum for greatest loads.

Higher superheat because water is not carried over into superheater tubes.

WHERE USED:

All over the world.

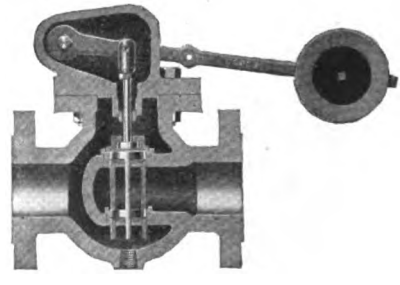
Wherever power boilers are used.

In 98% of the large modern central steam power stations of the U. S. A.

In over 90% of the modern boiler plants in the anthracite coal field. In practically every steel mill in the United States. In the majority of plants where modern devices to increase efficiency, save coal, and save labor are installed. On Heine, Stirling, B. & W., Erie City, Rust, Wickes, Manning, Badenhausen, Cahall, Bigelow-Hornsby, Nagle, Edge Moor, Keeler, Springfield, Geary, Ladd, Lancashire, Niclausse, Vogt, Union, and other makes of boilers. On boilers under all conditions of load and climate. On boilers aggregating a total of over 9,000,000 H. P. and varying in size from 50 to 5,000 H. P. —mostly over 200 H. P.

THE BEST PROOF:

The fact that there are more Copes Regulators in successful daily operation than all other makes combined is proof of the superiority of the Copes System.



CATALOGS:

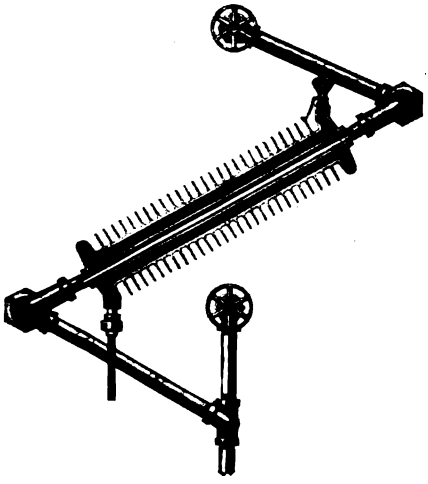
Ask for complete catalogs, specifications, quotation, charts, test data, etc. Give us your boiler conditions in detail.

Digitized by Google

THE "S-C" REGULATOR MFG. CO.

FOSTORIA, OHIO

Feed Water Regulation Engineers



The New "V-C-T" Generator

Broad changes in the design of the actuating element of the Regulator have produced the new "V-C-T" Generator. While operating upon the same principles utilized by the original Type "V" Generator, the "V-C-T" is vastly superior to it in manner of construction. It is of extra heavy bronze thruout, and is ruggedly built to withstand the most exacting service.

OPERATING SPECIFICATIONS:

Regulator to assure: Continuous, graduated feed at all times relative to load and furnace conditions.

Constant level on steady loads.

Safe high level on light loads. Safe low level on heavy loads.

Relative decrease in rate of feed to accompany sudden increase in load and vice versa.

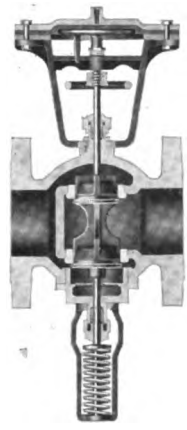
Regulator to operate without lost motion, and without waste from exhausts. To be sensitive to slight changes in level.

Regulator to operate without floats, weights, levers, chains, pilot valves, expansion tubes or other unreliable mechanisms.

Regulator to have self contained by-pass.

Regulator to have graduated restriction best suited for general operating conditions of each boiler so as to obtain maximum efficiency between no load and maximum overload.

Regulators can be furnished for steam pressures up to 600-lbs., and for boilers up to 5000 H.P. Each Regulator to be assembled to meet individual needs of boiler.



Improved Regulating Valve

Rugged design, careful construction in our own shops, and correctness of operating principles combine to make the "S-C" the ideal Regulating Valve. Ample diaphragm area and absence of wearing parts render it the most sensitive valve obtainable for this purpose. Valve body furnished of steam metal bronze, cast iron or steel. Seats and Discs are of Monel.

INSTALLATION SPECIFICATIONS:

No changes in present piping required. No framework, supports or braces necessary.

Generator to be placed on water column or boiler drum.

Valve to be placed at any convenient point in feed line.

All necessary piping (except blow-down) of seamless brass. Furnished with Regulator, cut to fit and ready to install.

Entire installation covered by blueprints and instructions.

"S-C" PUMP GOVERNORS:

Variable Excess Pressure, Type "A;" Constant Excess Pressure, Types "B" and "C;" Safety Stop, Type "D;" Variable Excess Relief Valve, Type "E." All are standard "S-C" instruments and fully guaranteed.

SOME "S-C" USERS:

United Electric Light & Power Co., Commonwealth Edison Co., Kansas City, Light & Power Co., Standard Oil Co., American Gas & Electric Co., Miwaukee, Electric Ry. & Light Co., General Electric Co., W. Va. Pulp & Paper Co., U. S. Navy Yards, New York Central Lines, City of Chicago, U. S. Steel Corp.

We'll Gladly Send Catalog No. 120.

Digitized by Google

COPPUS ENGINEERING AND EQUIPMENT CO.

MAIN OFFICE AND WORKS

342-348 PARK AVE., WORCESTER, MASS.

Engineers and Manufacturers of Turbo Blowers, Steam Turbines and Turbo Pumps

BRANCH OFFICES AND AGENCIES

CHICAGO, ILL.	MINNEAPOLIS, MINN.	NEW YORK, N. Y.	SAN FRANCISCO, CAL.
CLEVELAND, OHIO	MONTGOMERY, ALA.	PHILADELPHIA, PA.	TORONTO, CANADA
DENVER, COLO.	MONTREAL, CANADA	PITTSBURGH, PA.	WINNIPEG, MAN.
HAZLETON, PA.	NEW ORLEANS, LA.	SALT LAKE CITY, UTAH	VANCOUVER, B. C.

COPPUS CENTRIFUGAL TURBO BOILER FEED PUMP, TYPE CCC:

This pump with steam turbine forms a complete unit on a common shaft.

On turbine end, mechanical packing of the labyrinth type is employed, steam-tight for ordinary back pressures, needs no adjustment, not subject to wear. On the pump end is the only stuffing box of the unit, with high-grade plastic metallic packing.

One oil reservoir serves both bearings. Oil level for ball bearings is maintained regardless of amount of oil in the oil chamber.

Excess pressure pump governor and safety stop valve are furnished with every pump.

ADVANTAGES.—*Simplicity of Construction and Low Upkeep.*—Very few working parts, no valves. Only one stuffing box, easily repacked. Oiling system requires filling only a few times each year. No complicated governing devices and no sliding valves. Needs very little attention.

Continuous, Steady Flow of Water without Pulsation.

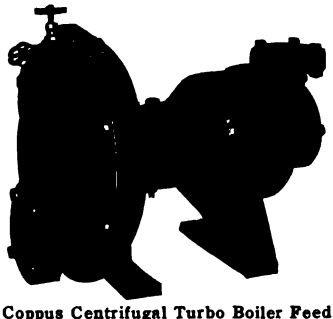
Great Flexibility, Constant and Easy Control of Feed Capacity.—After excess pressure governor has once been set to a certain pressure, feed water capacity is regulated by hand feed valve at boiler. Constant water level is easily maintained.

Exhaust Steam Free from Oil. Longer Life and Less Depreciation—assured the buyer by the high grade of materials used, the careful design and workmanship and the strict inspection and tests which must be passed.

Higher Steam Economy.—Steam economy should not drop more than 3% to 5% during the life of the pump.

Less Floor Space Required than for any reciprocating or turbine driven pump of corresponding capacity.

DATA REQUIRED WHEN MAKING INQUIRIES.—Name and location of plant. Total rated boiler capacity developed by boiler. Steam pressure. Degree superheat, if any. Temperature of feed water. Positive suction head (in feet) or pressure (in lbs.) under which water flows to pump. Back pressure against which steam is exhausted in pounds. Approximate length and size of feed line from pump to boiler. State if there is a big drop in steam pressure from boiler to pump. Advise if an open or closed heater is used or any other special arrangement.



Coppus Centrifugal Turbo Boiler Feed Pump, Type CCC

COPPUS STEAM TURBINES

This company builds steam turbines in sizes up to 50 h. p.

SIZES, CAPACITIES, ETC., OF TYPE CCC TURBO BOILER FEED PUMPS

Size	Capacity, B. H. P.	Max. Discharge Pressure, Lbs.	Steam Consumption, Lbs. per H.P.H.	* Pump Discharge Opening, Inches	* Pump Suction Opening, Inches	* Turbine Exhaust, Inches	* Turbine Exhaust, Inches
1¼	100-500	135	65-70	1¼ (p. tap)	2	3	1 (p. tap)
1½	500-1000	140	60-65	1½ (p. tap)	3	3	1½ (p. tap)
2	1000-1600	150	55-60	2	3	4	2
3	1600-3500	150	52-55	3	4	6	2½

*All flanged pump and turbine connections are furnished with companion flanges.

Digitized by Google

COPPUS ENGINEERING AND EQUIPMENT COMPANY
WORCESTER, MASS.

REGISTERED COPPUS U.S. PAT. OFFICE

COPPUS TURBO BLOWERS (TYPE C):

Built with either single- or double-stage impulse turbine, entirely enclosed, on the same shaft with a propeller fan.

Coppus construction insures quiet operation and high economy at the most efficient fan speeds. Turbine is provided with convenient hand valves for individual nozzle control. The steam chamber is small, yet of ample cross-section to prevent condensation.

The life of the machine depends largely upon the life of its bearings, and the life of the bearings is largely determined by their lubrication. It is very essential to give a great deal of attention to proper lubrication of the bearings on turbo undergrate blowers on account of the severe conditions under which they operate. The Coppus lubricating system is designed to take care of these exacting requirements. It is absolutely dust-proof, requires little attention, cannot get out of order with ordinary neglect and abuse, and no matter if some oil is used up, a constant oil level will be maintained in the upper chamber of the motor bushing.

The Coppus turbo blower is the only blower in which the fan does not overhang the bearing and in which the exhaust steam is discharged into the fan casing when desired, where it mixes thoroughly with the air. All stuffing boxes have been eliminated.

It delivers more air, size for size, at any specified pressures and uses 25% to 75% less steam than any other turbo blower made. This claim can be proved by comparative tests.

Special attention has been given to the fan casing in order to insure the highest efficiency. The casing hugs the fan and is expanded immediately beyond, relieving the chocking effect on the air by the casing, greatly eliminating friction and preventing the formation of eddy currents. This feature (Patent No. 1,308,982) has gone through all the tribunals of the United States Patent Office, during 4 years of interference proceedings, and this company has been awarded priority of invention of the expanded casing to the exclusion of all others.

For low steam consumption, high air delivery, simplicity of operation, low cost of upkeep and reliability, the Coppus turbo blower has proved a generally accepted leader.

HOW TO CHOOSE THE SIZE BLOWER BEST ADAPTED TO ANY BOILER:

This company's advice is, do not try; let the Coppus engineers do it. This will save considerable time and will avoid trouble and disappointment. It is not only a question of blower capacity, but the conditions under which the blower must operate that enter largely into its selection. One cannot afford not to take advantage of this company's wide experience, as this experience, more than mere calculations, will solve all blower problems.

Write for data sheet and send the necessary data so that conditions can be studied from every angle and a report will be furnished with this company's recommendations.



Coppus Turbo Blower, Type C

SIZES OF COPPUS TURBO BLOWER, TYPE C

Size Fan	Size Turbine	Steam Inlet	Number of Nozzles
10	9	½	1
12	12	¾	2
14	12	¾	2
16	16	1	3
18	16	1	3
20	20	1	3
22	20	1¼	3
24	20	1¼	3

Digitized by Google

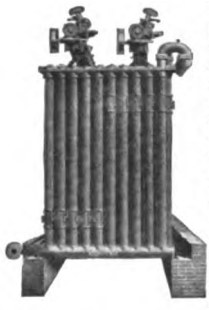
B. F. STURTEVANT COMPANY

HYDE PARK, BOSTON, MASS.

Offices in all Principal Cities

BLOWERS:
FANS and EXHAUSTERS:
FUEL ECONOMIZERS:

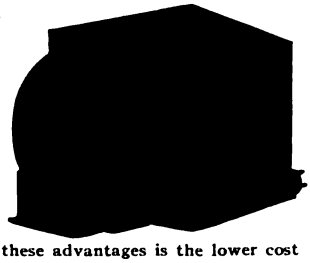
The Sturtevant Economizer effects:
A saving of 5 to 15 per cent in fuel
An increase of 10 to 25 per cent in boiler capacity
An appreciable extension of the life of a boiler
A purification of the feed water
A reduction in expense of repairs
Removes the deposit of large amounts of soot.



In the Sturtevant Economizer the pipes are arranged "staggered" instead of in straight rows, thereby giving the pipes a better opportunity to absorb heat from the gases. These economizers are made with taper metal-to-metal joints that require no packing, cement or rusting. The placing of the pipes of one row opposite the spaces of the adjacent sections increases the effective area of the transmitting surfaces and thoroughly breaks up the currents of hot gases by directing them between the pipes and against those standing in their paths.

GASOLINE ENGINES and GENERATING SETS:

GENERATORS, HEATING and VENTILATING SYSTEMS:



The fan system of heating has some very marked advantages over systems where steam pipes or radiators are located at various places throughout the building.

The chief of these advantages is the lower cost Other advantages are:

1. Greater flexibility
2. More readily controlled and regulated
3. Less trouble to maintain on account of absence of large number of separate radiators each having joints and valves subject to leakage. This eliminates damage to ceilings and materials through leaky water
4. Ventilates as well as heats
5. Much less radiating surface required. For same heat given to room only one-eighth to one-fourth as much area of steam pipe is necessary
6. Humidity can be controlled
7. No undesirable steam-piping to disfigure building.

MECHANICAL DRAFT MOTORS:
TURBOVANE FANS:



This type of fan was designed to meet a demand for direct connection to either a turbine or motor running at their most efficient speeds. The blades have a backward curve which reduces the velocity of the air leaving the wheel; consequently, the speed is greater for a given pressure.

Each of the stiffening rings is cut from a solid sheet and no welded joints are used in its construction.

The fan is so designed that the air enters and leaves the wheel with the shock loss greatly reduced which results in increased efficiency and a quietly running fan.

This fan insures absolute protection of its driving unit because of its non-overloading horsepower input curve.

PROPELLER FANS:

Propeller fans are designed for use against low pressures, and are applicable for ventilation and exhauster work in boiler and engine rooms, kitchens, clubrooms, smoking rooms, offices, stores and similar places.

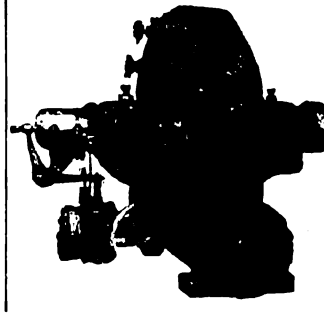
They are constructed with a frame of cast iron that is fastened into the wall of the building and are driven by either belt or direct-connected electric motors. The construction of these propeller fans is exceptionally strong and durable. Propeller fans are made in sizes from 18 to 120 inches in diameter.

STEEL PLATE FANS:

Sturtevant Steel Plate fans are designed for blower and exhauster work. They are the result of fifty years' experience in blower design, are especially strong and durable and are suitable for direct-connected steam engine and electric motor drive and for belt drive. Steel plate fans are built for ventilation and mechanical draft installations, and for planing mill and other exhaust work.

STEAM ENGINES:
STEAM TURBINES:

The Sturtevant Steam Turbine is of the multi-velocity type, and its operation is such as to give high efficiency, and permit of moderate rotative speeds without gears. Hand valves are used for shutting off the nozzles, and the speed is regulated by a centrifugal throttling governor placed on the end of the shaft.



Internal lubrication is unnecessary, therefore the exhaust steam is free from oil.

Five regular sizes from 5 to 250 H. P.

Approximate speed from 4000 to 1000 R. P. M.

Digitized by Google

L. J. WING MFG. CO.

350-360 WEST 13TH STREET, NEW YORK

WORKS: NEWARK, N. J.

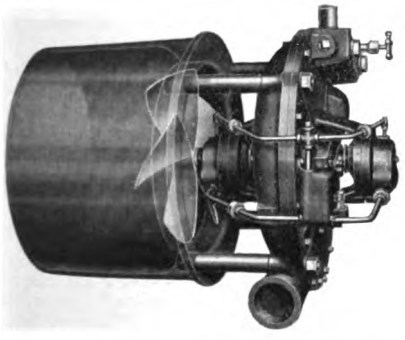
Manufacturers of Fans, Blowers, Turbines, Regulators

BRANCH OFFICES: ALL PRINCIPAL CITIES

Wing Turbine Blower

The present type Wing Turbine Blower, based on the development work of sixteen years by the pioneer manufacturer of this type of unit, is a remarkable combination of economical performance and high capacities, fitting it admirably for application to stokers no less than to hand-fired boilers. These compact direct-connected fans deliver volumes as high as 16000 cu ft. per min. against pressures of over 5″ static.

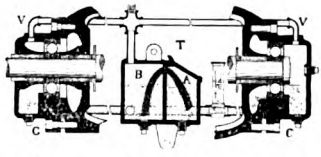
The unit consists of a highly economical propeller fan mounted on the shaft of a small turbine, operating in the Wing Patented Expanding Casing. The design of the casing with its deflecting curved surface enables the fan to put up economically the pressures required for underfeed stokers. For chain-grate stokers and hand-fired boilers, propellers designed for the lower pressures are employed. The turbine is made tight by means of regular, steam-turbine packing glands, fitting it for operation against high back pressures, and permitting the return of the steam to heater or heating line.



These blowers stand up for four and five years on twenty-four hour service, *without repairs*. This is made possible by the fact that the only frictional contact is in the bearings themselves, and these are heavy ball bearings thoroughly lubricated with positively filtered oil. The cut shows the two bearings, mounted in large housings containing the oil, *thru* which the bearings rotate. The small amount of make-up oil required is supplied to the tank at A, and, as needed, feeds over to B by passing thru wicks by capillary action. Thus *only* pure, clean, filtered oil, free from any solids, can reach compartment B, from which the oil flows to the bearings. The oil sight gage shows the operator at all times that the oil in the bearings is at the required level.

Should it be desired to inspect a bearing, all that is needed is to take off the cap—by removing four screws—which leaves the bearing completely exposed, in place on the shaft. The packing glands, too, are easily accessible, and since they are *split*, may be removed for re-packing, without disturbing any other part of the machine.

These simple, inexpensive but economical turbine blowers are low in first cost, nominal in up-



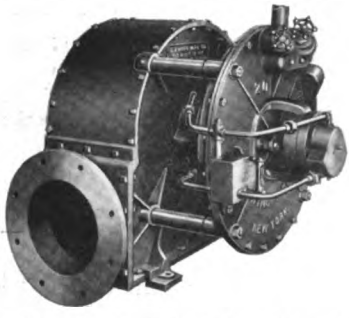
keep, and in a small, most compact mass possess the capacity to deliver economically greater volumes than a housed wheel having many times their bulk and floor dimensions. They can be very accurately controlled, for the turbine throttle valve gives the nicest possible degree of regulation. In a word, their application is aptly expressed by the phrase "For Every Fuel, For Every Furnace."

MOTOR-DRIVEN BLOWERS:

The Wing type E-M Motor-driven Blower is similar in general design to the turbine units, the motor being similarly supported from the fan casing, the propeller fan mounted on the motor shaft.

CENTRIFUGAL TURBINE BLOWER:

The Wing Centrifugal Turbine Blower is used instead of the Propeller type, where the installation of the latter presents difficulties, or when the blower is used for suction as well as pressure, or where the pressure required is in excess of 5″ to 6″. This type has a wide application in industrial processes, with gas producers, with pulverized fuel-burning equipment, for drying and circulat-



ing. The same simple design is used as with the propeller blower, that is, the fan wheel is mounted directly on the turbine shaft, and the turbine is supported from the fan casing. Any type of discharge may be furnished.

TURBINES:

Wing Power Turbines, similar in design to the turbines used for Wing Blowers, are furnished for driving pumps or other equipment. Horsepowers range up to about 50 h.p. depending on speed and steam conditions.

Digitized by Google

THE ENGINEER COMPANY

17 BATTERY PLACE, NEW YORK CITY

BRANCH OFFICES

ATLANTA, BOSTON, CHICAGO, CLEVELAND, DETROIT, INDIANAPOLIS, MILWAUKEE, MINNEAPOLIS, MONTREAL, NEW ORLEANS, PHILADELPHIA, PITTSBURGH, ST. LOUIS, WILKES-BARRE

Balanced Draft
Produced exclusively by The Engineer Company

A Better Combustion System

The Balanced Draft System secures a constant, pre-determined draft at all times, for all rates of combustion, regulating automatically the supply of air required for combustion and the flow of waste gases from the furnaces.

Where stokers are used, it also secures automatically a rate of fuel feed equal to the rate of fuel consumption in each furnace.

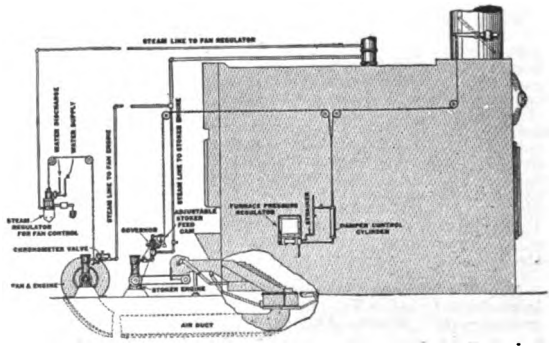
The diagram below shows the Balanced Draft System as applied to an underfeed furnace. The steam pressure regulator controls the speed of the blower. The furnace pressure regulator controls the flue damper, and, by means of the adjustable cam, the speed of the stoker engine. In each case, the operation of the control is automatic.

When the furnace pressure regulator is set for the draft of highest efficiency, it constantly maintains it, thus increasing the percentage of CO_2, and lowering stack temperatures. The efficiency of the heating surface and the capacity of the stack, both are increased.

Regardless of the fuel used—coal, oil or gas—Balanced Draft control of air supply and damper opening ensures the correct amount of air for best combustion, reduces the velocity of the hot gases through the boiler and prevents heat dilution by leakage of outside air.

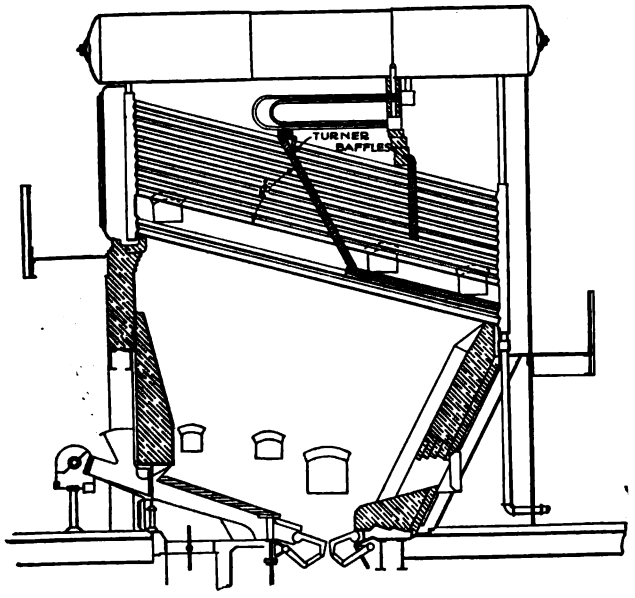
The Balanced Draft System of controlling fuel feed in direct relation to damper opening ensures automatic changes in the individual fuel beds to meet varying rates of combustion. It also permits manual adjustment in anticipation of peak loads and other special conditions.

The net result is more power at less cost. Complete information on request.



Digitized by Google

THE ENGINEER COMPANY NEW YORK, N. Y.



Turner Baffle Walls

Produced exclusively by The Engineer Company

The Turner Baffle Wall is composed of fire brick and fire-resisting cement in a plastic condition. It is built by our own expert workmen with our own materials and can be easily built from the inside without the removal of the side walls. Can be used in any type of boiler or superheater where the tubes pass through the baffle; a carefully worked out engineering structure.

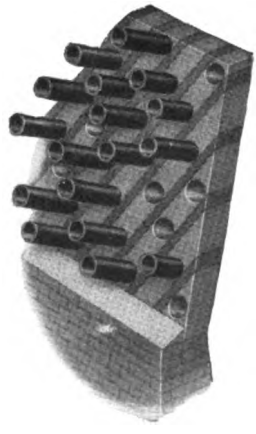
Built at the right slope, without limitations as to angles, the bridge wall may be carried back to any position. This increases the radiation surfaces of the lower rows of tubes and largely prevents clogging, due to flying slag particles, and also reduces the effect of reflected heat on stokers and furnace lining.

Turner Baffles are built tight. They stay tight—under most severe firing conditions. Cannot loosen, spawl, flake off or crumble. Tubes can be withdrawn without injury to the walls.

In use in boilers totalling over 200,000 horse power.

Complete information on request.

"Tight as a Drum"



SEE OUR ADVTR. IN MECHANICAL ENGINEERING THE JOURNAL OF THE A.S.M.E.

Digitized by Google

THE BAYER STEAM SOOT BLOWER CO.

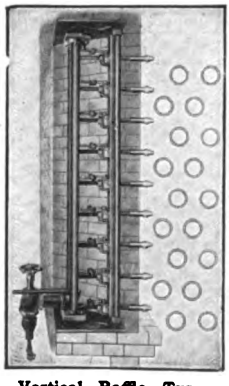
4056 PARK AVE., ST. LOUIS, U. S. A.

Manufacturer of Steam Soot Blowers

RECOMMEND THE BAYER:

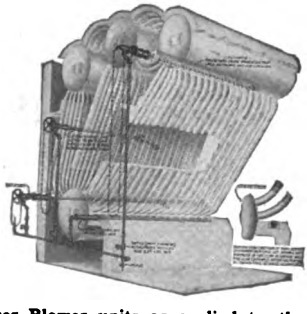
Because—

In actual figures of cost and performance, Bayer Blowers have proved of greatest efficiency, economy and durability. With the Bayer installed, any type of boiler can be thoroughly cleaned of soot and ash accumulations every few hours. The cleaning operation is so simple that it is never neglected; the boilers are always clean. The saving in fuel alone is from 4 to 9%. The Bayer Blower is standard equipment on all Heine boilers and in general use upon practically all other makes. The Emergency Fleet Corporation purchased approximately 980 Bayer Blowers.



Vertical Baffle Type, showing furnace wall built up under lower nozzles to deflect hot gases.

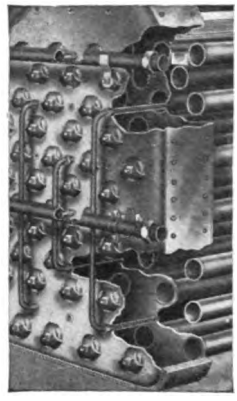
The Bayer Soot Blower does a *thorough* job. Just the turn of a valve and the work is quickly done—every particle of soot and ash being removed. It is easy to use, devoid of danger to workmen. Affords greatest economy of steam, thereby saving fuel. Requires less time for blowing, thereby saving labor. Is safest, surest, most scientifically correct in every way.



Bayer Blower units as applied to thoroughly clean a small boiler of the semi-vertical type. Simple, quick, dependable, efficient.

A Bayer for Every Type of Boiler:

There is a type of Bayer Blower for every type of boiler. Leading Industrial plants everywhere have found them economical, easy to install, dependable and satisfactory. Upon installation they soon pay for themselves in the amount of fuel they save. Fuel Saving alone is from 4 to 9% in every case. Boiler room costs are also materially reduced by the saving in labor, time and expensive steam hose necessary in the hand hose method of cleaning.

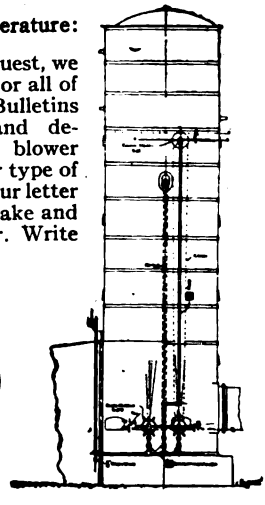


Showing a Bayer Blower installed on horizontal water tube boiler, having hollow stayed water legs. Note the substantial simple construction.

For Wickes and other vertical types, there are a number of Bayer Steam Soot Blowers especially designed for the particular requirements of each installation. The number of blowing units, as well as their location, varies according to the conditions.

Write for Literature:

At your request, we will send any or all of the Bayer Bulletins illustrating and describing the blower suited to your type of boiler. In your letter please state make and H. P. of boiler. Write today, please.



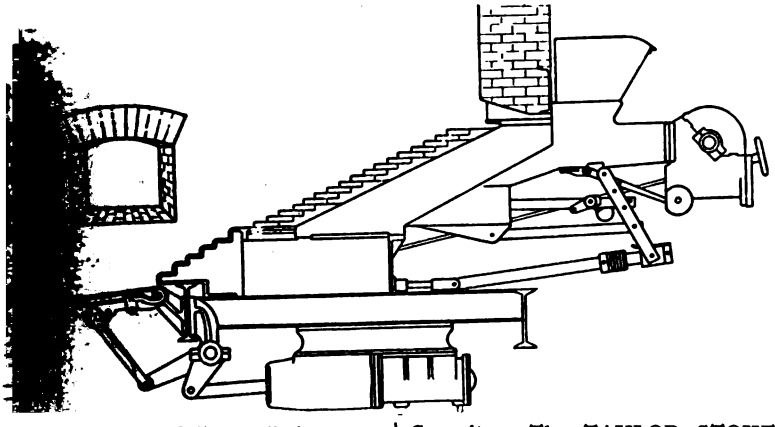
SEE OUR ADVT. IN MECHANICAL ENGINEERING THE JOURNAL OF THE A.S.M.E.

Digitized by Google

AMERICAN ENGINEERING COMPANY

PHILADELPHIA, PENN.

BRANCH OFFICES: Boston, New York, Baltimore, Pittsburgh, Cleveland, Cincinnati, Detroit, Chicago, New Orleans, Denver, and Salt Lake City. Taylor Stoker Co., Ltd., Toronto, Ont., Canada.



Application: Successfully applied to any boiler, either water tube or fire tube, to dryers, heat-treatment furnaces, and metallurgical furnaces.

Construction: The **TAYLOR STOKER** is made of standard retorts which have a depth correctly designed to permit packing of coal. This makes it possible to introduce draft under high pressure without blowing holes in the fuel bed. The increased density of the fuel bed promotes scrubbing action of air and gases of combustion, thereby procuring a more intimate mixture and a higher degree of combustion than would otherwise be possible. Coal and air supply are controlled by automatic regulation. The ratio of air and fuel can be varied in accordance with the quality of coal used. Refuse is removed by either hand or steam dump or by rotary crusher dump. The latter is continuous in operation.

All working parts are outside the furnace. A shearing pin in the speed-shaft clutch provides against damage due to foreign matter in the coal.

Flexibility: The TAYLOR STOKER responds instantly to steam demand. Authentic records, reproduced in pamphlet form, are available on request. The curves show a variety of conditions: dead bank to 270% of rating; live bank to 350% of rating, etc., with fuel ranging from lignite to high grade bituminous coal.

Capacity: The TAYLOR STOKER is capable of very high fuel burning capacity because of its design; *i. e.*, the arrangement of rams and the possible adjustment of their stroke, the design of tuyeres, and the large coking volume. The fuel bed is not agitated by mechanical means, and the fuel burns completely with a short, intense flame. Normal operation at 175% to 250% of rating is common practice with users of TAYLOR STOKERS. Peak loads requiring up to 350% of capacity can easily be carried for periods of one to four hours. Higher ratings have frequently been obtained, even over extended periods. 111

Service: Experts on steam production are available for engineering consultation. Inquiries are cordially invited.

Users of TAYLOR STOKERS include:

New York Edison Co.
Interboro Rapid Transit Co.
Detroit Edison Co.
Philadelphia Electric Co.
Standard Oil Co.
American Smelting & Refining Co.
Warner Sugar Co.
Procter and Gamble Co.
Studebaker Corpn.
Ford Motor Co.
Solvay Process Co.
Fisk Tire Co.
National Tube Co.
Pennsylvania R. R. Co.
And many others in all branches of industry.

SEE OUR ADVERTISEMENT IN THE MECHANICAL ENGINEERING JOURNAL OF THE A.S.M.E.

Digitized by Google

THE AUTOMATIC FURNACE COMPANY

DAYTON, OHIO

Manufacturers of Coal Burning Equipment

BRANCH OFFICES:

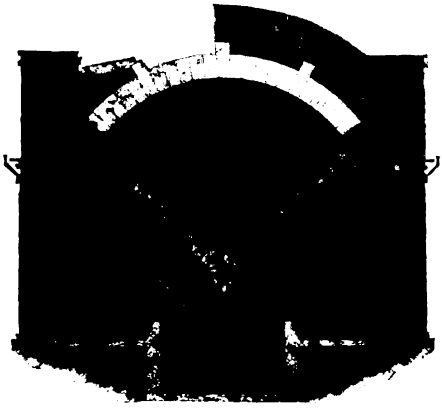
39 CORTLANDT ST., NEW YORK, N. Y. 205 S. ROBERT ST., 728 MONADNOCK BLOCK, CHICAGO, ILL.
242-244 LARNED ST., DETROIT, MICH. ST. PAUL, MINN. 714 FITZSIMMONS BLDG., PITTSBURGH, PA.

MODEL AUTOMATIC SMOKELESS FURNACE:

The Model Automatic smokeless furnace is so designated because it is an improved form of the side-feed type and embodies greater utility than any other make or type.

The devices for getting rid of the ash have been so designed and perfected that the furnace keeps the fire clean all the time, even when low grade fuel is used.

The principal parts of the furnace are not exposed to damage and will last a life-time. The grates are in pairs, one piece of each being stationary and the other movable.

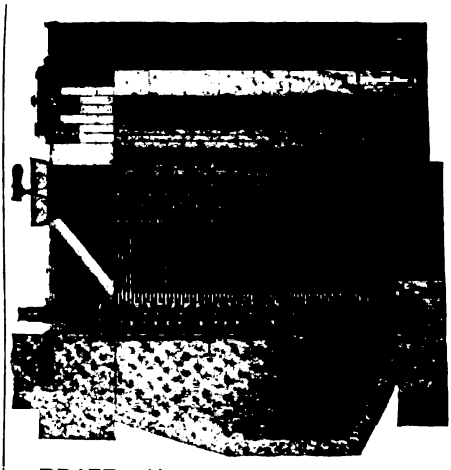


112

Illustrations show the narrow surface of each grate that is exposed to the heat and the broad surface on which the air acts and cools as it is drawn into the fire bed.

Each pair of grates can be renewed separately and each section of the bar that grinds up and discharges the clinker and coarse refuse can be renewed separately, and, if necessary, without putting the furnace out of commission or seriously interfering with its operation.

Air enters the fire chamber and is so admitted as to avoid overheating of the fire arch, arch plates and other parts and insures instantaneous, complete combustion.



DRAFT: The Model Automatic operates with either natural or induced draft. There are Model Automatics where ample draft is available that have crowded 500 H. P. boilers to 1500 H. P. for days at a time, maintaining a clean stack.

AUTOMATIC REGULATION: A combination draft and fuel feed regulator can be applied so that the rate of fuel feed, air supply and combustion correspond to the steam requirements.

No other mechanically operated furnace lends itself more advantageously to economic use of mechanical coal or ash handling. The clinker and other coarse refuse is broken up, so the ash is in suitable condition for any desired method or system of ash handling.

REPAIRS: The construction and arrangement of the Model Automatic Furnace provides for maximum self-protection to all parts subject to damage by heat or wear, and there is, therefore, a minimum cost for maintenance. The fuel saving is sufficient to pay for the necessary repairs and also give a large return on the cost of installation.

OPERATION: A small steam engine or electric motor is furnished with each furnace, battery, or row of furnaces driven through a set of double worm gears, thus giving ample power with use of little steam.

Mechanisms for operating both the stoking and cleaning arrangements are on the outside of the front, not exposed to the heat of the fire. Each part can be disconnected or connected without stopping engine or motor. Motion of clinker grinder can be varied to suit amount of refuse in the coal by simply pulling out a single pin and replacing it in the desired position, to keep the fire clear of refuse and not waste combustible in the ash.

Digitized by Google

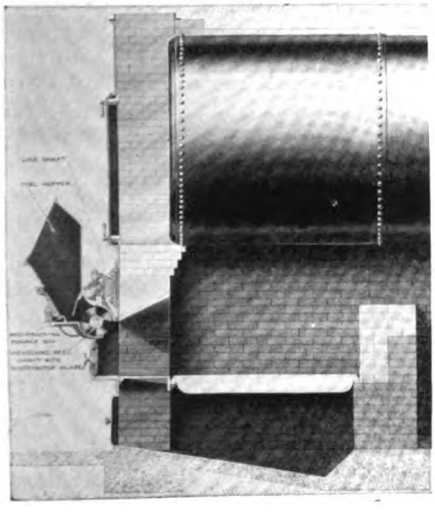
THE AUTOMATIC FURNACE COMPANY DAYTON, OHIO

CHAIN GRATE:

This company also manufactures the Model Chicago Chain Grate. It is of rugged, heavy construction and is designed to stand the trying service of boiler room equipment. Detailed description will be gladly sent on request.

THE DAYTON COAL FEEDER:

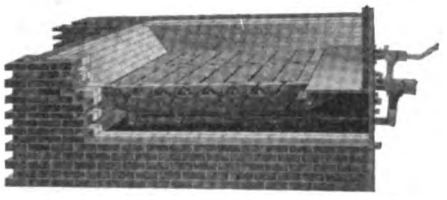
Is designed to meet the requirements of small boilers. It gives a constant light feed of coal and an even distribution over the grate surface, which results in increased efficiency and capacity and the elimination of the Smoke Nuisance.



It is practically foolproof, so reduces the amount of labor required and assists in eliminating the human element. As it is not exposed to the heat of the fire maintenance is nil.

THE CULVER SHAKING AND DUMPING GRATE:

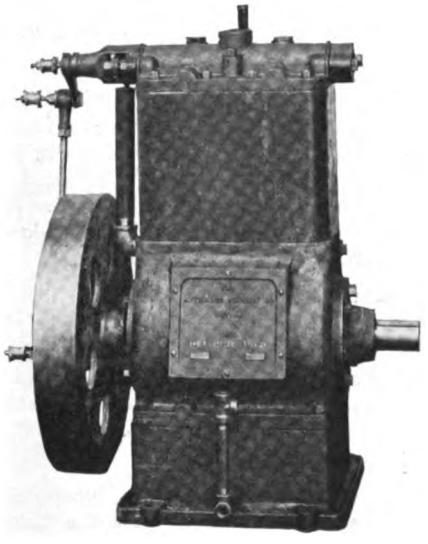
Has both a shaking motion, which is sufficient to clean the grate surface of ash and clinker, and a dumping motion in which every other grate raises up and the others drop down. When in this position the grates can be rocked, which will break up the largest and hardest of clinker and as an 8″ opening is afforded everything on the grate is dumped into the ash pit.



The fire surface is made up of small clips which slip into place and lock in position. As the grate is of substantial design maintenance is reduced to a minimum.

MODEL ACME STEAM ENGINE:

USES: There are now thousands of Acme engines in operation, and owing to their rugged construction, simple and durable design, they have no equal, operating as they do with the minimum amount of attention.



DESCRIPTION: Engine is of the single acting, two cylinder type. Designed to operate under a steam pressure of from 80 to 200 lbs. and a speed of 150 to 600 R. P. M. A pair of vertical cylinders are placed above an enclosed crank case which serves as a rigid foundation for the engine as well as a reservoir for the oil used in the automatic splash system of lubrication.

It is provided with generous sized ports for quick inlet and exhaust of steam. Valve is a one piece casting ground to fit an accurately bored chamber, the latter piece also serving as a cylinder head. Automatic relief valves are provided in the top of the cylinder head to insure quick release of any water which may collect in the cylinders, thereby eliminating any chance of damage from this source.

All bearings of this engine are of ample size and are continuously lubricated by a positive splash system contained in the crank case.

Digitized by Google

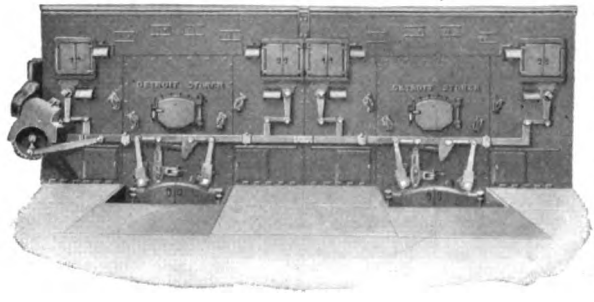
DETROIT STOKER COMPANY

DETROIT, MICH.

BRANCH OFFICES

CHICAGO	PHILADELPHIA	BOSTON	PITTSBURGH
NEW YORK	CINCINNATI	ATLANTA	CLEVELAND

DETROIT "V" TYPE STOKER:



Front View—Battery of Two Detroit "V" Type Stokers

Twenty Years in Service:

The Detroit "V" Type Stoker has been on the market for over twenty years and is backed by a clean record of saving in fuel costs varying from 10% to 25% and a saving in labor of from 50% to 75%. It is simple and rugged in design and is low in operating and maintenance cost.

Adaptability:

It is adaptable to all types and sizes of boilers. It burns economically all grades of bituminous coal and is capable of handling variable loads and heavy overloads with a minimum of attention.

Operation:

It is automatic in all its functions. Coal is continuously fed from the Coal Magazines to the upper end of the Grates. Each alternate Grate has a slicing motion which prevents clinker from forming on the Grates and keeps the entire fuel bed moving towards the Clinker Crusher at the bottom.

The Clinker Crushers have a continuous motion, grinding the clinkers and depositing the refuse and ashes in the Ashpit below.

Adjustments of the Stoker are easily and quickly made while in operation to meet any conditions of load or any grade of fuel.

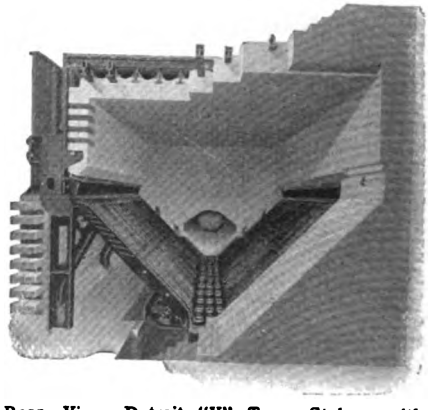
Construction of Arches:

The Detroit Stoker can be equipped with either the Radial Sprung Arch or the Detrick Flat Suspended Arch. Each tile of the Flat Arch is independently suspended from the center, allowing free expansion and contraction, and can be easily replaced without disturbing the Arch or brickwork.

This Arch insures high furnace and boiler efficiency and capacity as the gases of combustion are distributed evenly across the entire width of the Boiler.

The Arches are cooled by air admitted through openings in the front of the Stoker and being preheated passes into the furnace under control, through the tuyere over the coking coal supplying the oxygen for combustion.

Send for Catalog, Detroit Stoker Company, 7328 Woodward Ave., Detroit, Michigan.

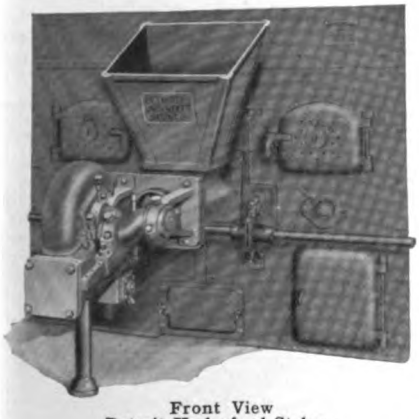


Rear View—Detroit "V" Type Stoker with Detrick Flat Suspended Arch

Digitized by Google

DETROIT STOKER COMPANY — DETROIT, MICH.

DETROIT UNDERFEED STOKERS:



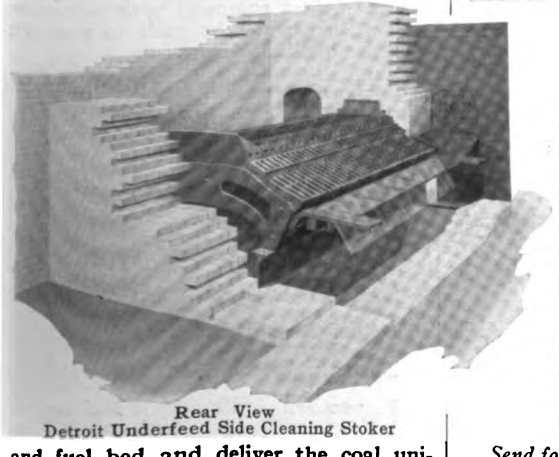
Front View
Detroit Underfeed Stoker

The Single Retort Side Cleaning Underfeed Type Stoker is adapted for use under medium and small size boilers. For large size boilers where fuel and ashes are handled with coal conveyors and ash handling systems the Multiple Retort Rear Cleaning Stoker is especially adapted.

Feeding:

Coal is fed from the hopper in front through the retort by means of a plunger or ram connected to a steel pusher rod and pusher blocks.

The pusher rod and blocks are located at the bottom of the retort below the fire



Rear View
Detroit Underfeed Side Cleaning Stoker

and fuel bed and deliver the coal uniformly the entire length of the retort.

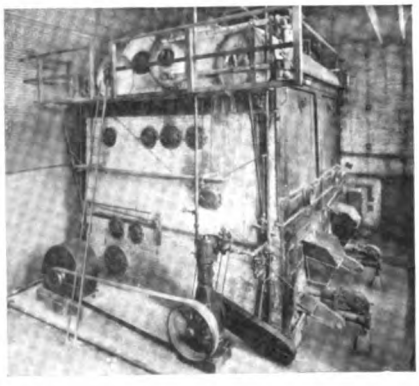
The plunger or ram is mechanically operated by means of a shaft and reduction worm gears connected to a small engine or motor. At the sides of the retort are a series of inclined grates or dead plates.

Handling Ashes:

An ash dump is placed on each side of the furnace and the ash, or clinker, is dumped into a pit below. The refuse is removed through the ashpit doors in front after being wet down and cooled, or delivered to a hopper or ash conveyor below.

Draft Control:

The arrangement for admitting air under control through especially designed



Typical Installation
Two 250 H.P. Water Tube Boilers Equipped with Two Detroit Underfeed Stokers

tuyeres at both sides of the retort, produces a high overload on quick demand. 150% to 200% of rating can easily be maintained with the Single Retort Underfeed Stoker.

Equipment:

The gears are semi-steel machine finished. All worms are steel drop forgings, thrust ball bearings, fully enclosed and running in oil.

Send for catalog, Detroit Stoker Company, 7328 Woodward Ave., Detroit, Michigan.

Digitized by Google

THE FREDERICK ENGINEERING CO.

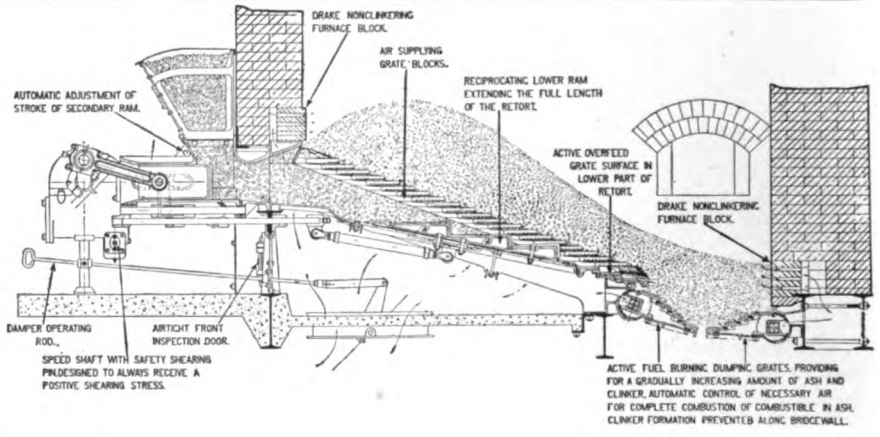
FREDERICK, MARYLAND

GENERAL SALES OFFICE
61 Broadway, New York City

BRANCH OFFICES
Principal Cities

WORKS AND ENGINEERING OFFICES
Frederick, Maryland

Manufacturers of the Frederick "Central Station" and "Super Station" Type Underfeed Stokers, the Frederick "Industrial" Type Underfeed Stokers, the Frederick Steam Jet Ash and Dust Conveyors



FREDERICK "CENTRAL STATION" TYPE UNDERFEED STOKER

116 **Construction:**

The Frederick "Central Station" type stoker is built on the inclined unit retort principle. The coal feed and air supply are automatically controlled to meet load demands. The ash and clinker are automatically deposited on the active dumping grates, which automatically provide space for the increasing amount of ash and clinkers, and automatically maintain the proper amount of air for complete combustion of the fuel at this point.

Adaptability:

Due to its simple construction with no operating parts below the floor line, the stoker is applicable to any type of boiler and can be set to give a relatively large combustion space, under relatively low boiler settings.

Flexibility:

The moving retort bottom acts on the entire fuel bed, distributing the fresh fuel over the air distributing tuyeres and quickly breaks up a banked fire. 250% of boiler rating can be obtained in less than five minutes from a banked boiler.

Capacity:

Due to the large underfeed grate area per retort, the special design of the tuyeres used and the constant breaking up action of the moving retort bottom, the capacity which can be obtained with the Frederick Stoker installed within ordinary furnace dimensions varies between 300-350% of boiler rating.

Service:

We maintain a service department always ready to assist our customers in connection with our stoker installations.

Continuous Ash Discharge:

Our stokers equipped with continuous ash discharge are designed to suit individual plant conditions.

A FEW REPRESENTATIVE FREDERICK STOKER INSTALLATIONS:

Carnegie Steel Company.

LeRoy Hydraulic Electric Gas Co.

Eastman Kodak Co.

Jamestown Street Railway Co.

Olean Electric Light & Power Co.

United Gas Improvement Co.

Northern Indiana Gas & Electric Co.

Hagerstown & Frederick Railway Co.

U. S. Naval Air Station.

Lord Construction Co.

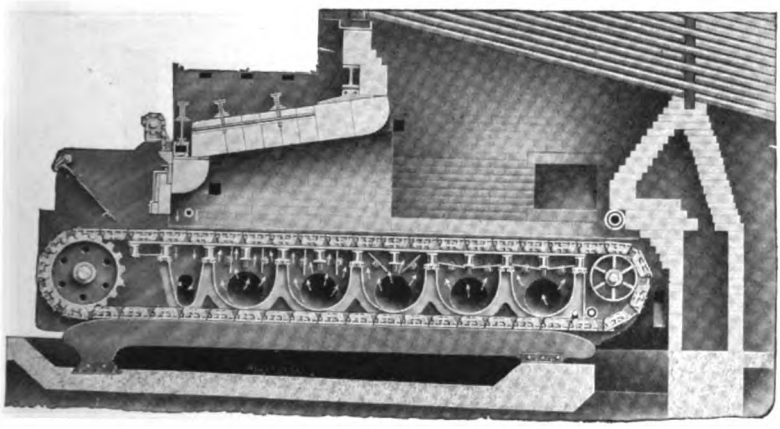
Digitized by Google

THE ILLINOIS STOKER CO.

ALTON, ILLINOIS

Manufacturers of Chain Grate Stokers

Type "G" Forced Draft **Type "A" Natural Draft**



TYPE "G" FORCED DRAFT STOKER:

There is no denying the basic advantages of the chain grate stoker principle. The chain grate stoker will not form objectionable clinker with high ash clinkering coal–requires less attendant labor because of its endless cycle of supplying fuel, burning fuel, and dumping the ash—requires far less driving power.

These are inherent advantages possessed by the most inferior as well as the best chain grate stoker.

To heighten these basic advantages—give the chain grate principle the advantages it deserves—is the idea behind the designing of the Illinois Type "G" Illinois Stoker with—

Dampered Air Control:

Test runs, as well as prolonged operating records, prove that the Illinois system of dampered air control is necessary to obtain consistently high efficiency at all loads.

Air chambers with dampers are placed at one to two feet intervals the entire length of the grate surface. By means of these dampers the supply of air to any portion of the grate can be controlled independently of any other portion.

This permits positive regulation of the supply, rather than the amount of air. At the fuel gate where the fuel bed is thickest and most air is needed the supply can be made greatest by means of the dampers. Just the reverse is true of stokers not equipped with dampered air control; the thicker the fuel bed on such stokers the greater the resistance, so when the draft is permitted to seek its own path the thinner portions of the fire, which need least air, receive most.

Through the use of air control dampers the draft may be entirely cut off beyond the point on the grate surface where the fuel is burning out.

When carrying a load of 50 per cent of boiler rating, approximately one-third of the grate surface is completely shut off. Instead of a large fuel bed with a reduced draft, dull fire, and reduced CO_2, the shorter fire is bright, snappy, and no coal gas escapes with the flue gas. Merely the amount of air is reduced, the supply of air remaining relatively as great as when the stoker is operated to produce overrating.

Mechanical Ignition:

Illinois mechanical ignition found only in the Illinois Type "G" Stoker gives the chain grate still wider range. Lignites containing as high as 45 per cent moisture are successfully burned. The illustration tells the story of this exclusive Illinois feature. An induced draft tuyere draws a small portion of the hot gas through the incoming fuel, insuring positive ignition of the fuels such as high-moisture lignites, anthracite culm and coke-braise. By eliminating the high moisture content of lignite from the furnace a frequent cause of furnace and arch depreciation is overcome.

Where heavy overloads are necessary the Illinois Type "G" Forced Draft Chain Grate gives a high degree of flexibility. Illinois dampered air control makes the application of mechanical draft to the chain grate stoker highly successful. The power required for the fan is only 1½ to 2 per cent of the total h. p. developed.

Type "A" Natural Draft Stokers:

In plants where loads are constant and the ignition point of the fuels burned is low, forced draft is not always a necessity. It is in such plants that the Illinois Type "A" Natural Draft Stoker finds its application. Type "A" is merely Type "G" minus the mechanical ignition and forced draft features. Proper regulation and control of air is assured by the same system of dampered air control found in the Type "G" Stoker. The various other advantages of the forced draft type—simplicity of operation, design of air space in the grate, ease of ash discharge—are retained in Type "A."

All Covered by New Catalog:

How special Illinois features have heightened the basic advantage of the chain grate principle is explained in detail in the new extensive Illinois Catalog "L."

Digitized by Google

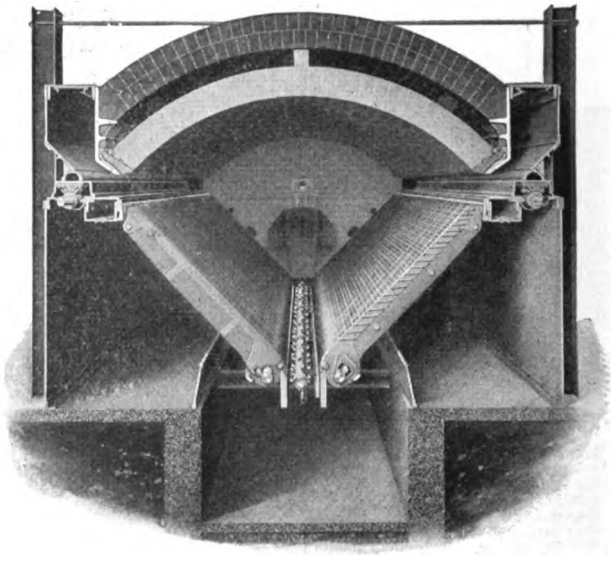
MURPHY IRON WORKS

Founded 1878

DETROIT, MICHIGAN

BRANCH OFFICES

BOSTON	NEW YORK	PHILADELPHIA		PITTSBURGH	BUFFALO
CLEVELAND	CINCINNATI	DETROIT	CHICAGO	ST. PAUL	DENVER



THE MURPHY AUTOMATIC FURNACE

Description: The correctness of the principle upon which the construction of the MURPHY AUTOMATIC FURNACE is based has been demonstrated by 43 years of stoker experience. Improvements have been made from time to time which have increased its efficiency and durability. With the MURPHY AUTOMATIC FURNACE, complete combustion prevents smoke and ensures high CO_2 results. All ash and refuse are removed automatically. This means a clean fire and high efficiency at all times. The MURPHY FURNACE does away with the necessity for opening furnace doors and thereby eliminates the admission of cold air; the coal supply to the furnace is under absolute control and automatic regulation; it is a Natural Draft Furnace and requires no expensive fan or blower equipment.

The arrangement of the grates, commonly known as "opposed type," offers many advantages. It gives double the coking area—necessary for smokeless combustion. It eliminates loss of heat due to radiation through side walls. It permits passing the air through the arch when it is preheated, effecting a further saving in heat units.

Adaptability: The MURPHY FURNACE is designed for any type of boiler and units from 50 h. p. up to the larger units for which the multiple retort underfeed stoker is best suited. It is exceedingly flexible and efficiently handles variable loads and overloads up to 200% of boiler rating with minimum attention and without forced draft.

Maintenance: Maintenance cost is low; averaging about 10 cents per B. H. P. per year. The magazines and fronts are protected by fire brick; the coking plates by air passing under them; and the clinker grinder, grate bearer and grates by exhaust steam and air, thus ensuring ample protection to all working parts.

SEE OUR ADVT. IN MECHANICAL ENGINEERING THE JOURNAL OF THE A.S.M.E.

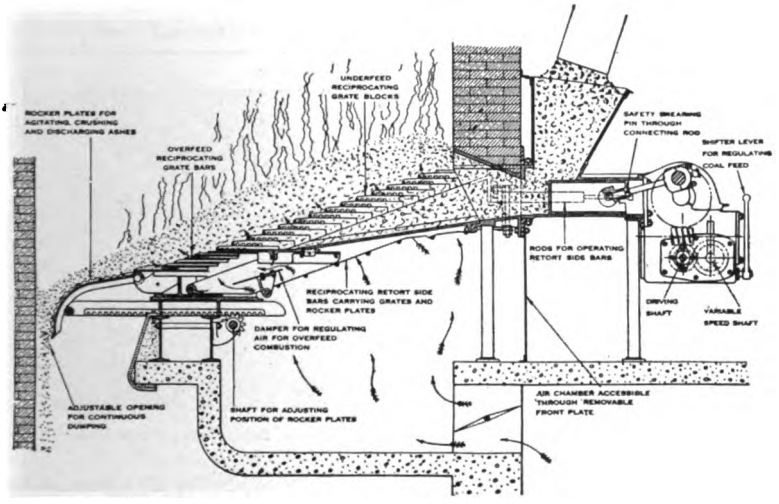
Digitized by Google

SANFORD RILEY STOKER CO.

WORCESTER, MASS.

BRANCH OFFICES

BOSTON NEW YORK PHILADELPHIA PITTSBURGH BUFFALO
CLEVELAND CINCINNATI DETROIT CHICAGO ST. PAUL DENVER



THE RILEY SELF-DUMPING UNDERFEED STOKER

Adaptability: Applicable to any boiler either water tube or fire tube, and to heating and smelting furnaces.

Construction: The RILEY STOKER is made up of standardized retort units. Its unique feature is reciprocating retort sides which keep the fuel bed active and even. The coal feed and air supply are automatically controlled to meet load demands. The dumping of refuse is continuous and automatic. A safety connecting rod for each plunger absolutely prevents damage to stoker in case plunger is blocked.

Flexibility: Moving air-supplying grates break up the banked fire and instantly admit the air, giving rapid combustion. RILEY STOKERS will raise a boiler from banked fire to 250% of rating in five minutes.

Efficiency: The boiler capacity which can be obtained with the RILEY STOKER depends upon the number of retorts that can be installed. With boilers fired from one end 300 and 350% of rating are obtained during peaks. In other cases where boilers are fired by two stokers set back to back 500 and 600% of rating are possible.

Fuel Control: The Riley Two-Speed Gear Box provides for an adjustable fuel supply. On large units the fires can be levelled, thinned or thickened as required.

A FEW INSTALLATIONS OF RILEY STOKERS:

Hartford Electric Light Co.
New York Central Railroad Co.
Buffalo General Electric Co.
Public Service Electric Co.
Goodyear Tire & Rubber Co.
Graton & Knight Mfg. Co.
Pierce Arrow Motor Car Co.
Spokane Central Heating Co.
Portland (Ore.) Rwy., Lt. & Pwr. Co.
Dodge Bros.
Endicott-Johnson Co.
General Elec. Co.
Cleveland Water Works.
Kimberly-Clark Co.
American Bridge Co.
American Sheet & Tin Plate Co.

SEE OUR ADVT. IN MECHANICAL ENGINEERING THE JOURNAL OF THE A.S.M.E.

Digitized by Google

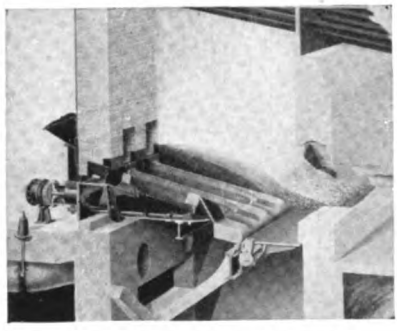
THE UNDER-FEED STOKER CO. OF AMERICA

GENERAL OFFICES: BOOK BUILDING, DETROIT

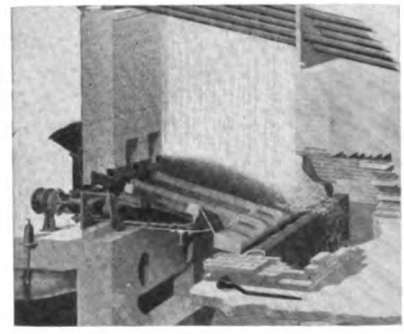
Makers of the Jones Stoker

BOSTON
BUFFALO
CHARLOTTE
CHICAGO
CINCINNATI
CLEVELAND
DALLAS
DENVER
KANSAS CITY
MINNEAPOLIS
NEW ORLEANS
NEW YORK
OMAHA
PHILADELPHIA
PITTSBURGH
SALT LAKE CITY
SEATTLE
TULSA

The Under-Feed Stoker Co., of Canada, 81 Victoria Street, Toronto



With Dump Plate in Position



With Dump Plate Dropped

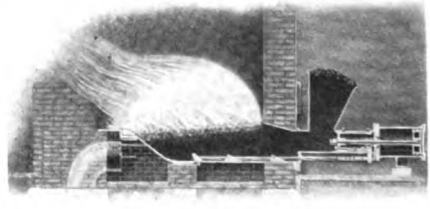
THE JONES "A-C" STOKER:

The operation of the Jones "A-C" Stoker is shown in the illustration below. Coal is fed to the hopper, outside the furnace wall, and is moved forward and upward by the successive strokes of the ram and pusher blocks. The fire is always on top, and as the fresh coal is slowly pushed upward it is gradually heated until coked.

During this coking process the volatiles released from the fresh fuel below, are completely burned in the zone of intense heat in connection with coke. This is the under-feed principle of combustion originated 33 years ago in the Jones Stoker.

Note extreme simplicity and minimum of moving parts, none in the fire—hence low maintenance. Fuel and air are automatically controlled and fed in the correct proportion at all times to insure even steam pressure regardless of load variations. Specially designed side tuyeres and automatic cleaning prevent clinker formation on side and bridge walls. Slight slope of retorts prevent avalanching and holes in fire; also prevent loss of unburned fuel into ash pit. Retorts may be individually controlled to insure an even fire and resulting high efficiency. Its heavy overload capacity, extreme flexibility, and marked economy make the Jones "A-C" suited to every plant condition. Every fuel is successfully burned; every load requirement met.

The "Automatic-Cleaning" ("A-C") feature reduces labor costs and insures continuous operation.



JONES "STANDARD" STOKER:

The principle of combustion employed in this stoker is the same as described in the outline of the "A-C." It meets the requirements of a wide range of plants and gives excellent results with all grades of coal. Can be used where space conditions make the installation of other types of stokers impossible.

Write for complete "Standard" catalog

"Pays For Itself—Then Pays Dividends

Digitized by Google

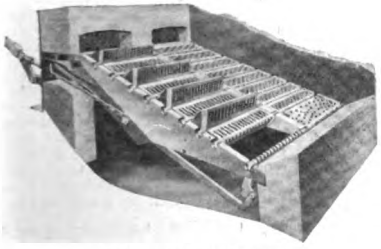
FLYNN & EMRICH COMPANY

BALTIMORE, MARYLAND

Exclusive Manufacturers of the
Huber Hand Stoker and Huber Sectional Boiler Fronts

Representatives in all of the principal cities in the United States

The HUBER HAND STOKER is the pioneer hand stoker. It enables the fireman to put

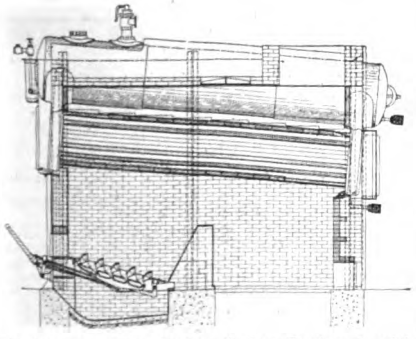


Huber Hand Stoker

into easy operation the coking method of firing, the best known means for the efficient combustion of bituminous coal for the generation of steam. Its simplicity, ease of operation and high efficiency are responsible for its unqualified success wherever installed.

The HUBER HAND STOKER has been so designed and constructed that it may be installed under any type of boiler without necessitating any change whatever in its setting and construction, merely the drilling of a few holes in the boiler front and the depressing of the ash-pit being all that is required.

Green coal is fired upon the first few stoker-bars only, where it is allowed to coke; the volatile matter distilled off, passes over a bed of incandescent coke on the balance of the stoker, reducing the amount of smoke to a minimum. The fuel is advanced by the movement of the stoker-bars, which are easily operated by levers at the side of the fire door. By the movement of the stoker-bars the fuel is completely broken up, finer ash is shaken through the stoker-bars, and clinkers are sheared off the side walls and forwarded to the rear drop at the bridge wall. By means of the simple movement of a lever the clinkers may be periodically dropped into the ash-pit, thus entirely cleaning the fires and making unnecessary the use of the slice bar.



Horizontal Water Tube Boiler Equipped with Huber Hand Stoker

The following guarantees are incorporated in the written contract of sale. When installed under boilers the HUBER HAND STOKER will:

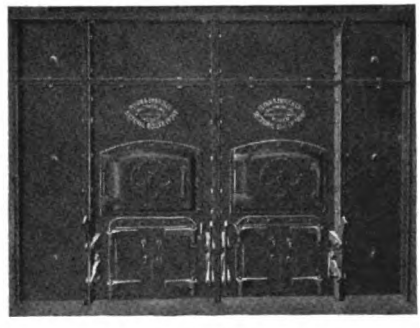
Evaporate ten pounds and over of water per pound of coal.
Develop an over-all efficiency of 70% or over.
Increase your boiler capacity from 25% to 75%.
Through almost perfect combustion will eliminate smoke so as to conform with the most rigid smoke laws.

The above guarantees are based on using coal of 14,000 B. t. u. and volatile matter not in excess of 20%.

By consuming the coal with much greater efficiency, coal consumption is materially reduced. In the average plant savings in the coal bills pay for the HUBER HAND STOKER in about four months' time.

Simplicity of operation reduces the labor of the fireman and, in large installations, usually permits of a reduction in the fire room force.

The HUBER HAND STOKER, in the hands of an inexperienced fireman, can produce results of evaporation equal to and in many cases greater than those obtained from the operation of the high priced and complicated mechanical stokers and chain grates which carry initial costs of from four to five times that required for the installation of the HUBER HAND STOKER.



Huber Sectional Boiler Front

Old-style boiler fronts are made in one or, at most, two castings. **The HUBER SECTIONAL BOILER FRONT** is built up of separate and distinct castings, accurately fitted, and bolted together.

This sectional system minimizes breakage due to expansion and contraction and permits easy replacement of any parts which might burn or break.

Being built in sections, the HUBER FRONT is easy to ship, easy to erect and easy to repair. It represents a distinct advance in boiler front design. Built for boilers of any size or type.

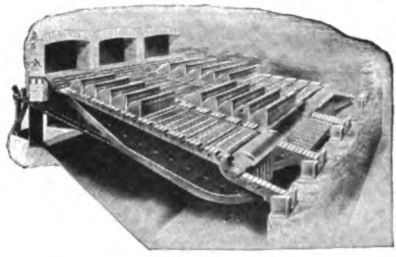
Digitized by Google

THE FILES ENGINEERING CO., INC.

PROVIDENCE, RHODE ISLAND

Branch offices in all large cities

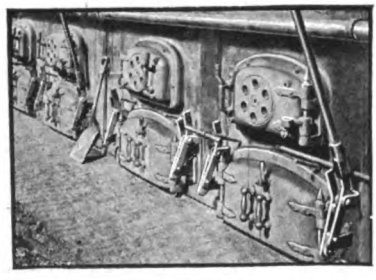
Manufacturers of The Files Hand Stoker



Files Hand Stoker

The Files Stoker can be installed in a few days under boilers of all types and sizes, requiring no remodelling of the plant or alterations in the settings. The boiler front is left intact other than the drilling of a few holes for the positioning of operating levers.

The coking method, recognized as the most logical and efficient means of burning coal, is one of the important features of the Files Stoker. The green coal is fired onto the foremost stoker bars where it is thoroughly coked; the volatile gases are released, and in their passage over the hot fire are completely consumed,—causing more intensified combustion and consequent smoke reduction and elimination. The coked coal is thereafter advanced by the operation of the stoker bar handles located at the boiler front.



Boiler Front View of Files Stoker

This movement actuates the stoker bars about 6 inches into the fire, breaks down all clinker and forwards ash and refuse to the dump plate at the rear. During this operation, fine ash is sifted into the pit without the loss of good coal. The fire is kept level and free of holes, resulting in the maintenance of a free passage of air throughout the entire fire-bed. Easy movement of the dump plate lever, performed at regular intervals from the front of the boiler, drops the counterbalanced cleaning plate and cleans the fire of all ash and refuse deposited on it. The shields which carry the grates are units in themselves and operate consecutively; therefore, one part of the fire may be stoked independently of any other section.

The fire is continuously kept clean, rich and uniform—all by the simple operation of the levers at the boiler front; use of the slice bar is absolutely eliminated. The fire doors are always kept closed and no loss of steam pressure is suffered. A balanced air supply, necessary to efficient combustion, is therefore obtained.

The Files Stoker is built of a special fire-resisting iron, possessing great tensile strength. Through perfect distribution of metal, simplicity of design, and ample provision for expansion and contraction, it is fitted for extremely heavy duty. Warping or burning of parts is unknown; long life and ease of operation are assured.

The stoker bars are equipped with grate sections which are interchangeable and can be easily removed and replaced—if necessary—without replacing the entire stoker bar. These grate sections are made with various air openings as high as 50% of grate surface, permitting the use of a wide range of coals and the satisfactory use of anthracite buckwheat as well as bituminous.

In five months the Files Stoker can more than save enough in coal alone to offset its initial investment cost. Cheap grades of fuel can be employed with good results; and high clinkered



Files Stoker and Mechanical Feed

coal will be burned completely and smokelessly where the Files Stoker is used.

The Stoker is highly flexible and will respond to all load demands with equal ease and economy. Will work up into high steam pressures and maintain ratings as high as 200% for several months at a stretch without extra exertion to the force or unnecessary damage to the boilers. The efficiency, capacity and reduction in labor costs resultant from the use of Files Stokers are guaranteed,—based upon plant conditions.

Aside from boilers, Files installations include stills, furnaces, ovens and other special equipment requiring the proficient use of coal as fuel.

MECHANICAL FEED:

The principal hand labor involved in the handling of the Files Stoker is the firing of the coal onto the first few stoker bars. This, in itself, may be eliminated by the use of the Files Mechanical Feed, which can be installed at a slight expense. In conjunction with the Files Stoker it will prove a highly profitable investment.

SEE OUR ADVTS. IN MECHANICAL ENGINEERING THE JOURNAL OF THE A.S.M.E.

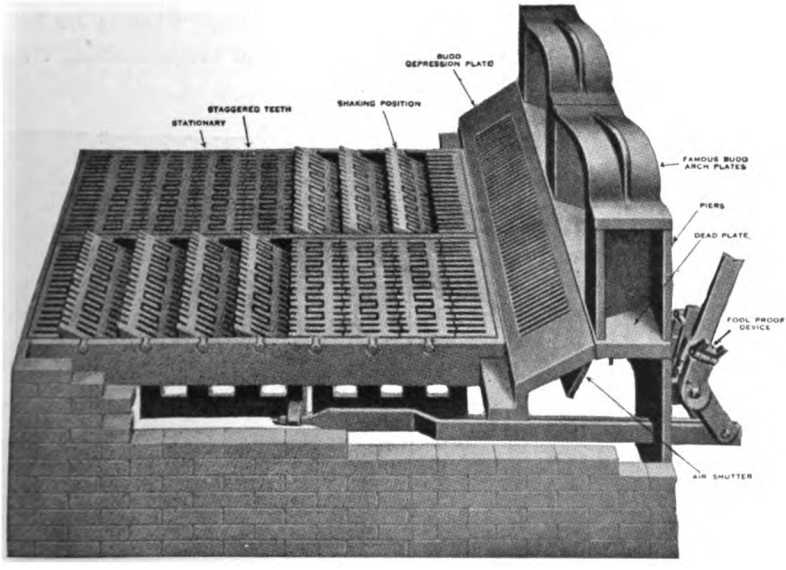
The new Files catalogue, containing full description and interesting illustrations, will be gladly sent upon request.

Digitized by Google

THE BUDD GRATE COMPANY

2013 E. LETTERLY ST., PHILADELPHIA, PA.

Manufacturers of Budd Boiler and Furnace Equipment
Aluminum, Iron and Brass Foundries. Machine and Pattern Works



123

PRODUCTS:

Budd Stationary Grates
Herringbone Grates
Pin Hole Grates
Straight Grates
Circular Grates
Brick Kiln Grates
Iron Arches and Jambs
Buckstays
Doors and Frames
Dead Plates
Door Liners
Floor Plates
Boiler Fronts
Babbitt Metal
Bushings
Aluminum Castings
Brass Castings
Bronze Castings
Copper Castings
Wood or Metal Patterns
Machinable Grey Iron Castings
Stoker Parts
Firestone Cement

THE BUDD IMPROVED UNIVERSAL SHAKING GRATE:

This grate and equipment (illustrated) is a development of which we are proud. There are no complicated working parts. The loss of good fuel is prevented, yet the double action clinker crusher keeps a clean fire. No burnt grate bars for the shaking device unlocks only when the grates are level. Truly a rugged grate for a rugged job.

Write for our publication *"Boiler Furnace Operation"* which gives full details and facts on fuels and combustion.

BUDD BABBITT METAL:

We ask a trial when all other babbitts fail.

FIRESTONE CEMENT:

For lining and patching fireboxes and cupolas and laying firebrick FIRESTONE has no equal.

Digitized by Google

HULSON GRATE COMPANY

GENERAL OFFICES AND WORKS: KEOKUK, IOWA

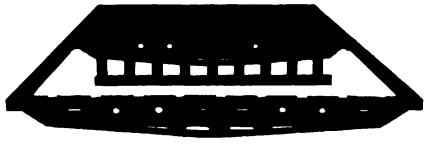
Manufacturers of the Hulson Grate for Stationary Boilers, Locomotives and Kilns

AIR SPACE:

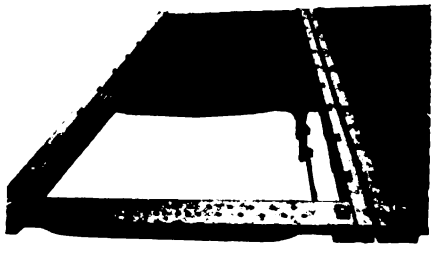
55% with ⅜" openings, 72% with ½" openings. Large percentage of air space permits more perfect combustion.

SHAKING:

The journals of the finger bars are located low in the bearing bars, the tops of the fingers are curved, so that when the grate is shaken lightly its surface moves in a principally horizontal direction. This light action shreds away the fine ash without stirring or agitating the fire.

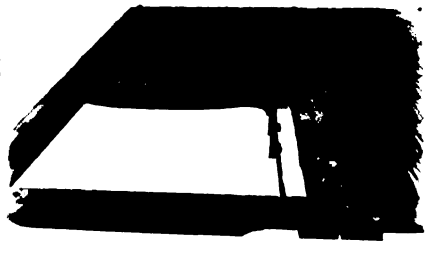


The Hulson Grate can remove the fine ash from beneath a three or four inch slack fire without disturbing the fire bed, and without loss of live fire or green fuel. The removal of the fine ash as soon as it is formed tends to eliminate clinker formation. However, should the fire be allowed to get heavy the full throw of the grate will work all dead matter through. The full throw brings the tips of the fingers up into the dead matter, a distance of approximately two inches; they have a double cut, forwards and back which produces a tearing action on the bottom of the fire. No large opening is made to allow the fire to avalanche into the ash pit, all dead matter must be worked through the Hulson Grate. Clinkers are broken up and crushed before reaching the ash pit.



REPAIRS:

The fingers are loose on the bar held on by a key moulded on the bar. The fingers being loose, all expansion and contraction are taken care of at this point. The finger bars are so far below the fire that they are not affected by the heat. Owing to its large percentage of air space and the large amount of air travel the Hulson Grate is less liable to overheating.



The illustrations show the method of making repairs. The damaged finger is broken completely away from the finger bar. The remaining fingers are pushed over to fill the gap and the new castings applied to the shaker-arm end of the finger bar.

Digitized by Google

HULSON GRATE COMPANY — KEOKUK, IOWA

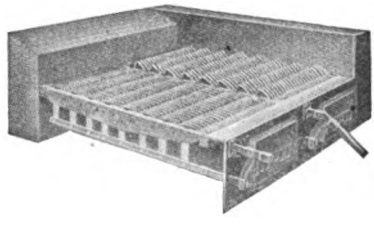
The fingers can be applied with the finger bar in position. The top of the journal and the key on the shaker-arm end of the finger bar are cut away on an oblique. The finger must be tapped lightly past the key. It assumes a vertical position. The last finger cannot be removed as it is partially engaged by the key.



In a grate with a solid finger bar, should a portion of it become damaged the whole bar is lost, weighing from 50 to 150 lbs., depending on the size of the grate. With the Hulson Grate only those parts that are damaged need be replaced. The ⅜" size fingers weigh approximately one and one-half pounds, the ½" size, one and three-quarter pounds. Should any accident damage the finger bar proper, the bar only is lost, and none of the fingers.

The Hulson Grate rests in the furnace the same as does the old style bar grate, the front on the lip of the dead plate, the rear on the bridge-wall rest. It is made to fit present furnace measurements the only condition being that the length over all, including rests, be a multiple of seven inches. It is made any number of sections wide to accommodate firing doors.

In making replacements the only change in brick work necessary is on the bridge wall to adjust the length measurement. The only machine work necessary is the drilling and tapping the boiler front for shaker brackets.



Grates over 70 inches in length are equipped with double shaker connections so as to shake in front and rear sections.

Further information will be gladly furnished on request.

Digitized by Google

McCLAVE-BROOKS COMPANY

SCRANTON, PA.

Manufacturers of McClave Combustion Systems

NEW YORK OFFICE
S. C. SMITH, Mgr.
1502 Printing Crafts Building

CHICAGO OFFICE
F. G. SMITH, Western Manager
515 Hearst Bldg.

PHILADELPHIA OFFICE
GEO. BLAIR, JR., Rept.
401 Morris Building

BOSTON OFFICE
A. R. ST. JOHN, Mgr.
261 Franklin Street

PITTSBURGH OFFICE
H. L. HERGETT, Mgr.
1623 Oliver Building

SYRACUSE OFFICE
W. H. GOODRICH, Rept.
130 Hope Avenue

DALLAS OFFICE
D. G. COUNTS, Rept.
705 Elm Street

CHARLOTTE OFFICE
C. H. THOMAS, Mgr.
213 S. Myers St.

McClave GRATES STOKERS STEAM BLOWERS CB

Trade Mark

PRODUCTS:

McClave Automatic Stokers; McClave Semi-Automatic Stokers; McClave Hand Fired Stokers; McClave Grates; The Argand Steam Blower; Expansion Boiler Fronts.

McCLAVE SEMI-AUTOMATIC STOKERS:

These stokers are made in two types, "M-A" for burning the very fine sizes of anthracite; and "M-B" for burning bituminous slack, both coking and non-coking, and mixtures of bituminous with anthracite screenings, or coke breeze in varying quantities.

McCLAVE HAND-FIRED STOKERS:

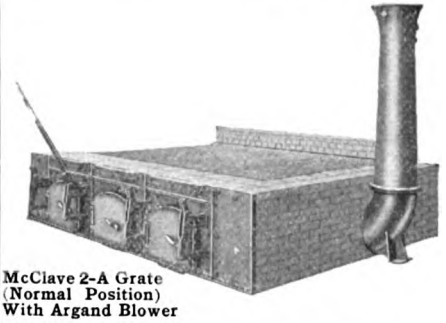
Can be had equipped to burn any kind of bituminous coal, lignite, bagasse and various combinations as desired.

This, like the automatic and semi-automatic stokers, is equipped with the McClave Sectional Top Grates which make replacement of burned out sections easy and greatly reduce maintenance cost over solid type grate bars.

McCLAVE 2 A GRATE:

McClave 2 A Grate is the latest development of McClave Shaking and Cut-Out Grates, and is designed for use in plants where space limitations prevent the installation of stokers, but where greater efficiency and economy are essential.

Like all McClave Grates, this equipment can be operated with full cut-out movement, full shaking movement, or divided cut-out and divided shaking movement.



McClave 2-A Grate
(Normal Position)
With Argand Blower

THE ARGAND STEAM BLOWER:

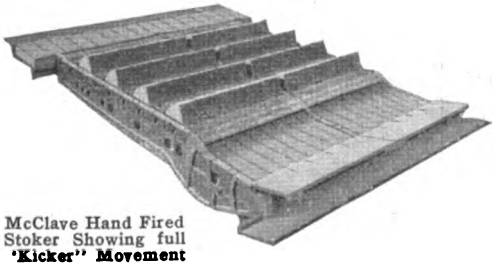
In addition to the advantage of a blast mixed with steam, which will soften clinker formation, the Argand Steam Blower is exceedingly economical of steam because of its scientifically prepared design.

Used in combination with McClave Stokers or Grates, it forms a very effective combustion system.

McCLAVE DESIGN AND SERVICE:

Every part of any McClave System has been carefully designed and built to take care of expansion and contraction through short lines of metal and proper re-inforcement. **Only the best materials are used in a plant where every process is controlled by the manufacturer, and where the highest workmanship is a tradition for more than forty years.**

An Engineering Department is maintained for the service to clients and the solution of fuel and combustion problems.



McClave Hand Fired Stoker Showing full "Kicker" Movement

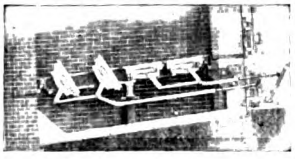
Digitized by Google

WASHBURN & GRANGER, INC.

50 CHURCH ST., NEW YORK, N. Y.
BOSTON, MASS., 141 Milk St.

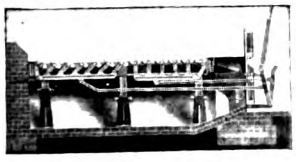
Manufacturers of the Dean Dumping Grate, the Dean Shaking Grate, Dean Flat Suspended Arches, Dean Fire Brick Linings, Incinerators and Destructors, Boiler Fronts and Furnace Castings, Ash Hoists, Floor Plates, Ash Gates, Trench Plates

DEAN DUMPING GRATES:



Built for burning the small sizes of anthracite coal with either natural or forced draft. Bars tip in tandem to an angle of sixty-five degrees and are supported at both ends by a rectangular frame which eliminates entirely the tendency of the bars to hang downward on the ends. Air spaces 1/8" to 3/8" slot and also built in the pin-hole form with 1/4" or 5/16" diameter openings. Fires can be cleaned in one-half the time required with stationary bars. Catalogue No. 7 on request.

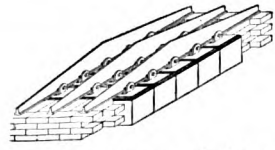
DEAN SHAKING GRATES:



Used for bituminous and the larger sizes of anthracite coal, both fuels requiring a grate with an oscillating or shaking movement. Supported by a frame resting on the ash-pit floor independent of the brick work with bars placed on 8" centers, allowing ample opening for the largest clinkers. Journals self-locking, requiring no caps. The sides of the bars are made solid which is a necessity as ninety percent of the wear comes along these edges. Construction is of the most durable form, to withstand hard service. Catalogue No. 7 on request.

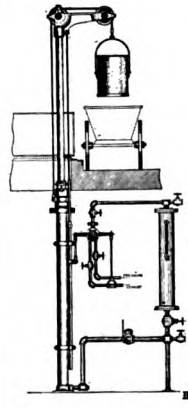
DEAN FLAT SUSPENDED FURNACE ARCH:

The "Dean" flat suspended arch is designed to provide for unusual expansion and contraction and economy in maintenance and renewal. Blocks are 9" x 12" suspended from cast iron tees and held in place with clips and bolts. The finest flint clays are used in the manufacture of these blocks, which are thor-



oughly baked and have a fusing temperature of 3200 degrees F. Each block can be renewed independent of all others and the stresses and strains incidental to all sprung arches supported by skewbacks are eliminated.

DEAN ASH HOISTS:



This hoist is built for lifting a can of ashes or other material, quickly and economically, from the basement floor to the street.

It is wire-rope geared and can be operated by either air, steam, water, electric or hand power with equal facility. The controlling valve is of simple construction. It is also equipped with mechanism acting automatically upon the operating valve to retard the speed and stop the plunger, without shock, at the extreme limits of the plunger stroke.

Complete information upon request.

INCINERATORS AND DESTRUCTORS:

We have patterns and designs for incinerators for burning rubbish and waste material, suitable for institutions, hotels, schools, apartment houses, museums, factories, etc.



We build garbage destructors of the brick set type suitable for large hospitals and hotels, and a portable type for use in large residences, clubs, restaurants, etc., designed with a steel casing and lined with fire brick to be operated with coal or gas as fuel. Send for catalogue No. 9 "Incineration."

Digitized by Google

FULLER-LEHIGH COMPANY

(Successor to Lehigh Car, Wheel & Axle Works)

FULLERTON, PENNA., U. S. A.

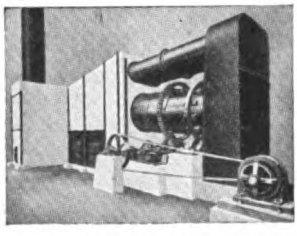
Manufacturers of Pulverized Coal Equipment, Crushers, Dryers, Car Wheels and Axles, Chemical Castings, Special Castings in Green Sand or Loam, Etc.

PULVERIZED COAL EQUIPMENT:
Superior in
Design Efficiency Performance



Lehigh Crushing Rolls

We are in position to furnish all the various units used in connection with furnaces heated by means of pulverized coal. At the present time our Pulverized Coal Equipments, consisting of Lehigh Crushing Rolls, Indirect Fired Rotary Dryers, Fuller Kinyon Conveying System, Fuller-Lehigh Pulverizer Mills, Pulverized Coal Feeders, Burners, and Fuller Quality Sprocket Wheels, are in-



Indirect Fired Rotary Dryer

stalled in plants having a capacity of 35,000 tons of pulverized coal per day. These plants are widely distributed and



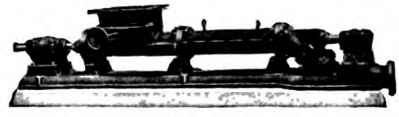
Fuller Mill, Pulley Driven



Fuller Mill, Gear Driven

are pulverizing coal obtained from a large number of fields in various coal-producing districts.

The types of furnaces heated with Pulverized Coal are quite diversified, and we enumerate here some of the furnaces at present heated by means of this most economical and efficient fuel in order to convey some idea of the wide application of Pulverized Coal for heating various types of Industrial Furnaces.

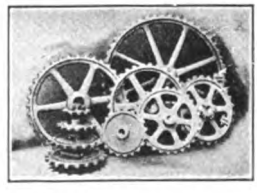


Fuller Kinyon Pump for Conveying Pulverized Coal

Annealing Furnaces
Bar Heating Furnaces
Billet Heating Furnaces
Calcining Furnaces
Drying Furnaces
Forge Furnaces
Locomotives
Nodulizing Furnaces
Open Hearth Furnaces
Ore Roasting Furnaces
Piled Scrap Heating Furnaces
Puddling Furnaces
Rotary Cement Kilns
Rotary Lime Kilns
Steam Boiler Furnaces, Marine and Land Type

SEE OUR ADVTS. IN MECHANICAL ENGINEERING THE JOURNAL OF THE A.S.M.E.

Send for Illustrated Bulletin No. 600.



Face Hardened Sprocket Wheels

Digitized by Google

QUIGLEY FURNACE SPECIALTIES COMPANY

Incorporated

26 CORTLANDT STREET, NEW YORK CITY

SALES OFFICES

BUFFALO BALTIMORE CHICAGO DENVER PHILADELPHIA PITTSBURGH PROVIDENCE

Representatives in 44 cities in the United States and Canada

FOREIGN OFFICES: London, Paris, Barcelona, Tokio

Engineers, Designers, Contractors. Complete Powdered Coal Equipments Including Furnaces. Also Makers of HYTEMPITE and INSULBRIX

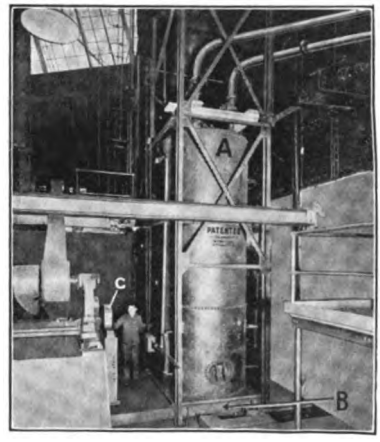
QUIGLEY PATENTED SYSTEM OF POWDERED COAL EQUIPMENT:

In the Quigley System of preparing, transporting and burning powdered coal, the powdered fuel is automatically weighed as sent to the furnace bins. Transportation of the fuel is through wrought pipes to the furnace bins which may be in widely separated departments.

The system of distribution consists of pipes with switching valves conveniently located, the turning of which diverts the coal to bin or bins as desired. These bins are located at the furnaces with an ample fuel supply for 10 to 24 hrs. The controller used to regulate the fuel feed is of simple design having only two working parts but is positive in action. By turning a hand or chain wheel, absolute control of fuel fed to burners is obtained.

The fuel is fed by the controller into a low pressure air system which carries the fuel into the burner where it is mixed with a larger volume of combustion air at a pressure just above atmosphere, thus securing the lowest velocity and most perfect combustion.

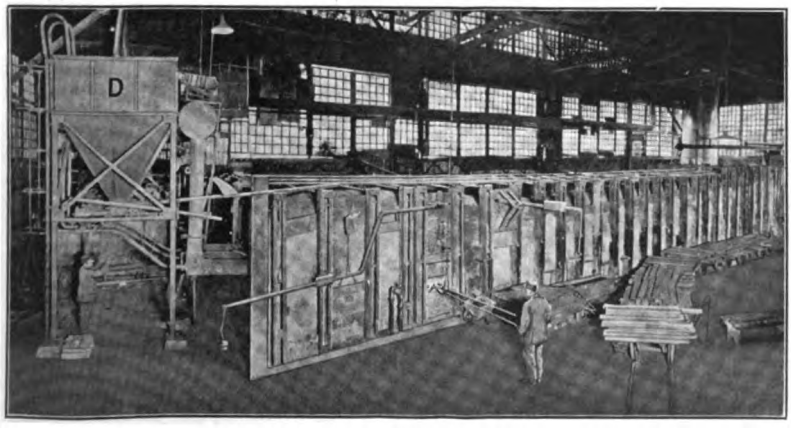
Safety, reliability and freedom from floating dust are features of this system.



Powdered Coal Blowing Tank

A—Blowing Tank **B—Scale Platform**
C—Scale Dial **D—Furnace Bin**

Send for Bulletin No. 11 describing complete system with illustrations of plants now in successful operation.



170 Foot Billet Heating Furnace Fired with Powdered Coal by the Quigley System

(See pages 138–139 for additional products of this Company)

Digitized by Google

W. N. BEST FURNACE & BURNER CORP.

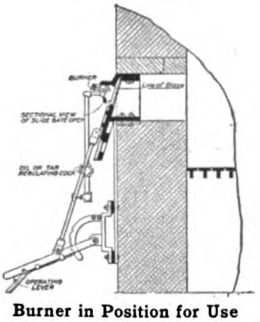
Successors to W. N. BEST, INC.

11 BROADWAY, NEW YORK

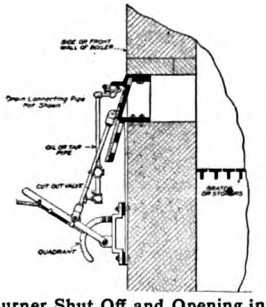
Engineers in Caloric; Liquid Fuel Equipment; Furnaces for Heating, Melting and Heat Treatment of Metals. High Pressure, Low Pressure, Volume Air, Air Carburetting and Mechanical Burners of All Sizes

W. N. BEST CALOREX EQUIPMENT:

MAKE YOUR POWER PLANT DEPENDABLE. IF YOU ARE AT PRESENT BURNING COAL, INSTALL OIL AT ONCE AS AN EMERGENCY FUEL, AS A CERTAINTY FOR MEETING PEAK LOADS WITH THE CALOREX EQUIPMENT.



Burner in Position for Use



Burner Shut Off and Opening in Furnace Wall Closed

For burning oil or tar in combination with coal in either hand-fired or stoker-fired boilers, or in bagasse-fired boilers using oil exclusively or coal exclusively, or bagasse exclusively; or can be used to quickly double or triple the rating of the boiler by using the oil or tar in combination with coal, breeze or bagasse. Simple of operation. Easily installed. Any man of ordinary intelligence can learn to operate it in ten minutes.

We believe no power plant in which coal is used as a fuel is safe today without liquid fuel equipment for use either in combination with coal (where coal is cheap and the oil is high) or for the use of oil exclusively as fuel when necessity demands. The use of liquid fuel elevates the mind of the fireman, for it is a science, while the burning of coal necessitates, brawn rather than brains. This fuel also gives the man in the boiler room confidence, for he knows his ability to meet the fluctuating loads, no matter what may be the climatic conditions, winter or summer.

In many power plants the W. N. Best Calorex Liquid Fuel System is used in combination with coal to carry the peak loads demanded of the boiler, a few hours in the morning and for a few hours in the afternoon or whenever the power is intermittent. This invention, lately patented by Dr. W. N. Best, is a model of simplicity, durability and efficiency in securing and maintaining CO_2 from the fuel in the firebox of boiler when burning oil exclusively or when burning coal in combination with oil. If it is desired to operate the boiler with coal only, the flow of oil through the burner is stopped by the operating valves as shown in cut, and the slide gate is closed which can be done in a quarter of a minute. The air for combustion is admitted below the sheet of flame immediately under the burner in the accurate, regulated quantities required for the perfect combustion of the oil. The air damper can be so regulated by the lever on the quadrant as to insure accurate regulation either at maximum or minimum capacity.

In gas works where considerable water-gas tar is made as a by-product, with this invention this is a very superior fuel because of its high calorific value when thoroughly atomized. This tar can be burned either in combination with the coal or breeze, or can be used exclusively as fuel. When the supply of tar is exhausted, the burner is shut off by means of the valves and the slide gate is closed, which hermetically cuts off the outer air as well as seals the opening in the side wall of the boiler, after which coal can be burned in the boiler exclusively in the usual manner. When a supply of tar has again accumulated, the burner may be again operated in the usual manner.

CALOREX

We have some interesting literature we will send gratis.

(See Part VI for additional products of this Company)

Digitized by Google

A. M. LOCKETT & CO., LTD.

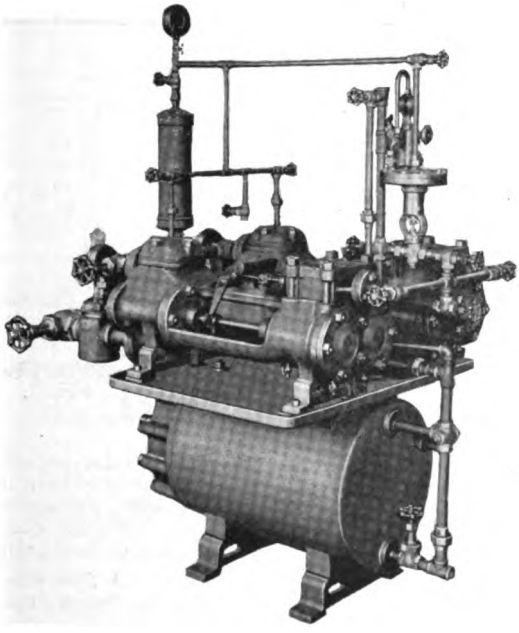
Contracting Mechanical Engineers

MANUFACTURING AND GEN. SALES OFFICES AT

NEW ORLEANS

SALES OFFICES AT

HOUSTON, TEX. FORT WORTH, TEX. SHREVEPORT, LA. ATLANTA, GA.
HAVANA, CUBA SAN JUAN, P. R. NEW YORK CITY



Lockett Automatic Oil Pumping Set

THE LOCKETT OIL-BURNING EQUIPMENT as manufactured to-day represents the experience gained by our Engineering Organization over a period of twenty years in the efficient burning of various grades of liquid fuel.

This experience embraces not merely the designing of the apparatus but also close contact with actual results obtained in service, and so enables us to modify our apparatus to suit the changing character of liquid fuels being offered.

The Lockett equipment has been made as simple and rugged as possible with a minimum of parts and at the same time the materials used in this equipment are the best of their respective kinds, so that we take a pardonable pride in offering to our customers apparatus suitable in each case for the work for which it is sold.

We have made a special study of the proper furnace design and oil heaters for efficiently burning the heavier Mexican oils in various types of boilers.

Our new booklet *"A. M. L. 106"* gives information of general interest on the subject of Oil Burning as well as describing some of our products. Copy will be furnished on application.

We manufacture Lockett Automatic Oil-Pumping Sets in standard sizes from 100 to 10,000 H. P.; Lockett and Babcock and Wilcox Flat-Flame Steam Atomizing Oil Burners; Nelson Porcupine Type Multi-Pass Oil Heaters; Lockett Oil Strainers; Special High-Pressure Pumping Sets for Marine Use.

We are prepared to quote on equipment for any particular case or special conditions and also on complete installations for either stationary or marine work.

SEE OUR ADVTS. IN MECHANICAL ENGINEERING THE JOURNAL OF THE A.S.M.E.

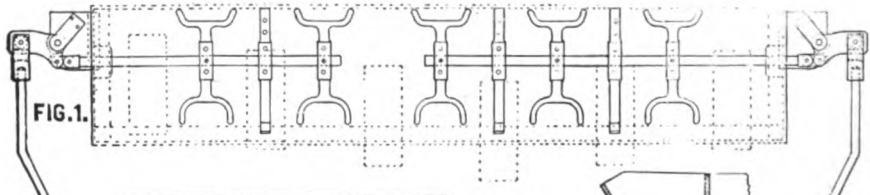
Digitized by Google

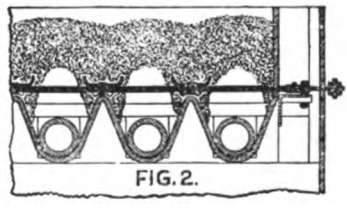
W. E. ELLIS COMPANY

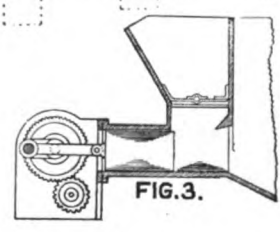
HAVERHILL, MASS. U. S. A.

SELLING AGENTS

BOSTON	A. S. Morrison	201 Devonshire St.
NEW YORK	H. R. Geiger	90 West St.
PHILA.	Jay G. Thomas	34 So. 17th St.
PITTSBURGH	Dempcy-Degener Co.	708 Penn Ave.
CLEVELAND	The Tucker-Day Mchy. Co.	1404 E. 9th St.
DETROIT	Geo. D. B. Van Tassel	410 Moffat Bldg.
ST. PAUL	R. B. Whitacre & Co.	205 So. Robert St.
CHICAGO	H. Stillson Hart Charles F. Fitts	523 Railway Exchange







132

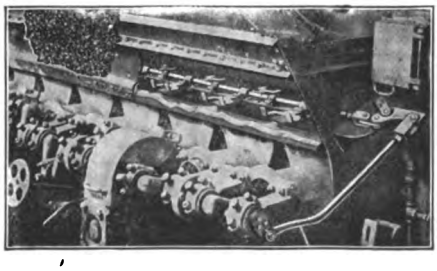
NEGUS-TIFFANY COAL AGITATORS:

Negus-Tiffany Coal Agitators, when attached to Multiple Retort Underfeed Stokers of the Westinghouse, Taylor and Riley Types, insure even feeding of the coal to the boilers under all circumstances whether the coal be dry, moist or very wet.

Figure 1—is a plan view of the Agitator attached to a 6 Retort Stoker. The U-shaped Agitator Arms attached to a horizontal rod are given a reciprocating motion by a suitable connection through a bell crank and connecting rod and crank attached to the main stoker crank shaft.

Figure 2—shows very clearly how these U-shaped Agitator Arms are carried back and forth through the bases of arches that form in coal, breaking bases and precipitating the mass of coal into the spaces in front of the Rams.

Figure 3—is an end view of the hopper showing the position of the U-shaped Arms in the bottom of the hopper.



The Agitator constantly keeps a full charge of coal in front of the Rams, eliminating hand poking and insuring even fires free from holes, effecting both economy and increased boiler efficiency.

A FEW USERS OF NEGUS-TIFFANY COAL AGITATORS:

Haverhill Electric Co. Haverhill, Mass.
Boston Woven Hose and Rubber Co. Cambridge, Mass.
Stone and Webster Boston, Mass.
Haverhill Box Bd. Co. Haverhill, Mass.
Lowell Electric Co. Lowell, Mass.
United Electric Light Co. Springfield, Mass.
Worcester Electric Light Co. Worcester, Mass.
American Printing Co. Fall River, Mass.
United States Finishing Co. Providence, R. I.
Union Street Railway Co. New Bedford, Mass.
Fitchburg Gas and Electric Co. Fitchburg, Mass.
American Brass Co. Waterbury, Conn.
Charles H. Tenney and Co. Boston, Mass.
Winchester Repeating Arms Co. New Haven, Conn.
Public Service Electric Co. Newark, N. J.
Atlantic Sugar Refineries, Ltd. St. John, N. B.
Richmond Light and Railroad Co. New Brighton, N. Y.
Consolidated Gas, Elec. Lt. and Power Baltimore, Md.
Philadelphia Suburban Gas and Electric Co. Phoenixville, Pa.
U. S. Navy Yard New York City
New York Edison Co. New York City
Mass. Institute of Technology Cambridge, Mass.
and many others

Catalogues, Circulars and Quotations on request.

SEE OUR ADVTS IN MECHANICAL ENGINEERING THE JOURNAL OF THE A.S.M.E.

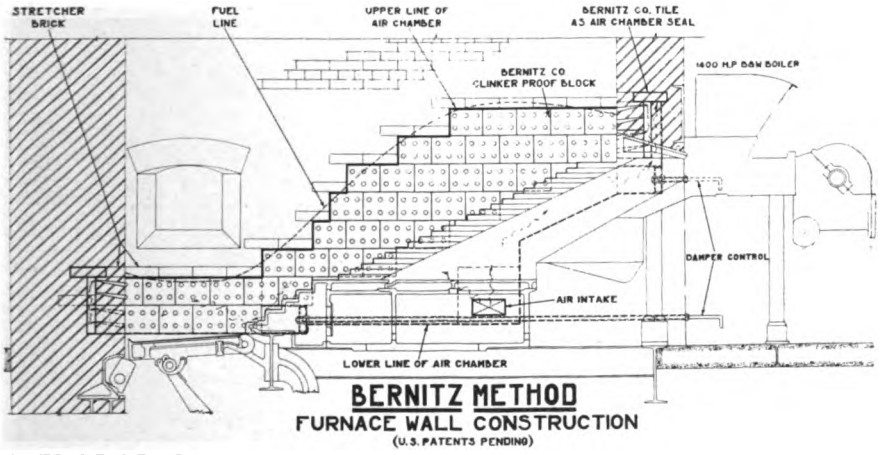
Digitized by Google

BERNITZ FURNACE APPLIANCE CO.

15 STATE STREET, BOSTON, MASS.

Furnace and Combustion Engineers

BRANCH OFFICES: NEW YORK, ATLANTA, PITTSBURGH, CLEVELAND, CHICAGO, DETROIT, PHILADELPHIA AND ST. LOUIS



CLINKER-PROOF FURNACE WALLS:

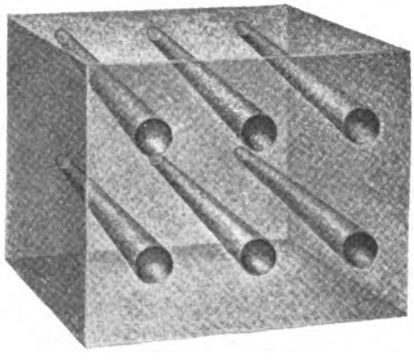
Products: Bernitz Co. Clinker-Proof Blocks, Bricks, and Special Tiles.

Construction: The BERNITZ METHOD consists of a simple system of air ducts built in the fire brick wall back of the furnace lining connected with a series of apertures which permit a fixed supply of cool air to enter through the lining where it contacts with the fuel bed, whereby the furnace walls are made **Clinker-Proof** and **Heat Resistant.**

Durability: In furnaces where formerly linings lasted only from thirty to sixty days, linings protected by the BERNITZ METHOD have been in service over three years and are still good.

Adaptability: The BERNITZ METHOD is adapted for use with all types of stokers and furnaces where the formation of clinkers on the fire walls interferes with efficient and continuous operation. The construction can readily be installed in old boiler settings as well as new.

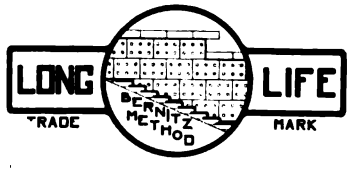
Ten Good Reasons for Using This **Clinker-Proof** Construction: 1. Allows highest temperatures. 2. Increases capacity. 3. Aids combustion. 4. Increases life of furnace walls and settings. 5. Increases life of stokers. 6. Eliminates shutdowns caused from clinker troubles on fire walls. 7. Saves fuel. 8. Saves labor. 9. Makes operators more contented. 10. Results in highest efficiency at lowest maintenance cost.



Front Face

Downwardly Sloping Apertures, Flared toward the Fire, Mean Slow Velocity of Air and Minimum Air Admission with Maximum Cooling Effect. Large Openings on Fire Face do not Slag Over.

Write for descriptive folder and list of users



Digitized by Google

DRAKE NON-CLINKERING FURNACE BLOCK CO.

INCORPORATED

5 BEEKMAN STREET, NEW YORK

Manufacturers of Drake Non-Clinkering Furnace Block

WHY Do Drake Blocks Make Clinker Formation a By-gone?

The illustrations show how and why.

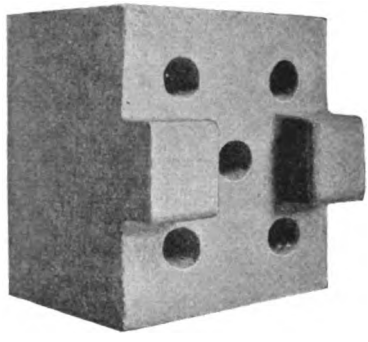
A study of these illustrations of DRAKE BLOCKS only emphasizes their worth in modern engineering practice. They successfully meet the needs of the hour. Remember DRAKE BLOCKS are applicable to all kinds of furnaces; can be thoroughly bonded together and easily installed. The assistance and intelligent coöperation of our engineers is yours, without incurring any obligation.

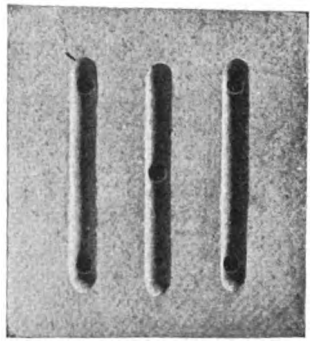
1. Fluted construction positively prevents clinker formation. Proper amount of air supply is afforded at all times.

2. Increased jet velocity reduces friction by means of tapered air nozzles.

3. Air duct formed by lugs on back, within 9" lining, makes a solid, substantial furnace lining.

4. Area of holes is designed for a positive supply of air, proportionate to the rate of combustion.





(Patents Pending)

Your Request to Us or Our Nearest Branch Brings All Details.

Agencies in Principal Cities

Digitized by Google

CELITE PRODUCTS COMPANY

NEW YORK, 11 Broadway
PHILADELPHIA, Liberty Bldg.
PITTSBURGH, Oliver Bldg.
CLEVELAND, Guardian Bldg.
DETROIT, Book Bldg.
CHICAGO, Monadnock Bldg.
ST. LOUIS, Railway Ex. Bldg.
LOS ANGELES, Van Nuys Bldg.
SAN FRANCISCO, Monadnock Bldg.

DESCRIPTION:

Sil-O-Cel is used to prevent heat penetration. It is produced in brick, blocks, powder and cement forms from Celite, a mineral extremely light in weight and possessing unusual heat insulating qualities.



SIL-O-CEL INSULATING BRICK:

Made in standard fire brick sizes and are used as an insulating backing for the refractory in all types of high temperature equipment.

SIL-O-CEL BLOCKS:

Made in sizes 6 x 18", 6 x 36", 1, 1½, 2 and 3" thick. They are a bonded form of Sil-O-Cel suitable when a high temperature insulation is required in large sections.

SIL-O-CEL INSULATING POWDER:

This form has the same insulating qualities as Sil-O-Cel Brick but is used where brick is not adaptable for insulating, such as hot blast stoves, gas generating equipment, doors of ovens and boilers. It is also used for fire-proofing and sound-deadening in building construction.

SIL-O-CEL C-3:

A semi-refractory material of high insulating value, prepared in granular form. When suitably bonded by the addition of 20 per cent by volume of Portland Cement (process patented) and moistened slightly, this material is ideal for insulating furnace bases, doors, etc. The mixture should be rammed into place.

SIL-O-CEL C-22 BRICK:

A semi-refractory type of Sil-O-Cel Brick made in standard fire brick sizes. Being free from shrinkage at high temperatures, will not spall with sudden temperature changes. These brick are recommended as an intermediate insulating course for the protection of the insulation under extreme temperature conditions.

SIL-O-CEL INSULATING CEMENTS:

Are adaptable for the insulation of irregular surfaces or in places where other Sil-O-Cel products are not adaptable. They are prepared in three coats and applied as follows:

Sil-O-Cel Sticking Cement (First Coat) is used to produce a surface to which the second, or insulating coat, will adhere.

85% Sil-O-Cel Insulating Cement (Second Coat) is the insulating coat, having unusually high insulating value and durability under heat.

Sil-O-Cel Hard Finish Cement (Third Coat) is used to give the work a smooth, hard, durable finish.

CELITE HIGH TEMPERATURE CEMENTS:

Celite High Temperature Cements are mixtures of ceramic materials, scientifically compounded for laying, facing and patching fire brick work in boiler settings, furnaces, etc. They set up under the action of heat, making a bond structurally as strong as the fire brick with absolutely no shrinking or swelling. Celite High Temperature Cements bond the refractory together, making a solid monolithic structure.

Sil-O-Cel Insulating Products will prevent heat loss and increase the output of the equipment, save fuel, better working conditions and insure more accurate control of temperatures. They are applicable to:

Annealing Furnaces	Hot Blast Mains
Annealing Pits	Hot Metal Cars
Bakers' Ovens	Ingot Molds
Boiler Settings	Incinerators
Bustle Pipes	Japanning Ovens
Chill Rooms	Kilns
Coke Ovens	Lead Pots
Core Ovens	Hot Blast Stoves
Crematories	Malleable Furnaces
Crucible Furnaces	Melting Pots
Dryers	Metal Mixers
Dust Catchers	Oil Fired Furnaces
Electric Furnaces	Oil Stills
Enameling Ovens	Pipe Covering, Etc.
Forewarmers	Pre-Heaters
Foundry Ladles	Regenerators
Gas Generators	Soaking Pits
Gas Producers	Soap Kettles
Glass Lehrs	Spelter Pans
Gun Furnaces	Sulphur Burners
Heat Treating Equipment	Tunnel Kilns
High Temperature Flues	Waste Heat Boilers
	Water Gas Sets



Boiler Side Wall Insulated with Sil-O-Cel Insulating Brick

ENGINEERING SERVICE:

An engineering department is maintained for the purpose of providing additional data and will gladly give the benefit of their experience in working out any specific problem which may confront you.

Bulletins containing Engineering Data on any of the above types of equipment will be sent on request.

SEE OUR ADVTS. IN MECHANICAL ENGINEERING

Digitized by Google

CRESCENT REFRACTORIES COMPANY

CURWENSVILLE,

CLEARFIELD COUNTY, PENNSYLVANIA

PLANTS

CURWENSVILLE — CLEARFIELD — LUMBER



Interior Curwensville Plant

Daily Capacity 275,000

Crescent, Liberty, Rockton, Suskana,
FIRE CLAY BRICK AND DUST:

For the following Service:

Blast Furnaces

Hot Blast Stove and Pipe Linings

Open Hearth Regenerators

Soaking Pits

Puddling, Heating and Busheling Furnaces

Foundry Cupolas

Core Oven and Annealing Furnaces

Crucible Furnaces

Forge Furnaces

Brass Furnaces

Enameling Furnaces

Iron and Steel Ladles

Glass Regenerators and Lehrs

Boiler Settings

Cement Clinker and Cooler Rotary Kiln Linings

Vertical and Rotary Lime Kilns

Coke Oven Regenerators

Gas Producer and Flues

Calcined Flint Clay Grog and Dust

Refractory Ground and Batch Clays

Special Fire Brick Shapes for High Duty Service

They Stand The Test

SEE OURADVTS IN MECHANICAL ENGINEERING THE JOURNAL OF THE A.S.M.E.

Quality, Service and Reliability

Digitized by Google

KING REFRACTORIES CO., INC.

MAIN OFFICE AND WORKS
1709 NIAGARA ST., BUFFALO, N. Y.
Offices in All Principal Cities

Manufacturers of Flame Brand High Temperature Cements



BLUE FLAME FIRE BRICK CEMENT is a carefully compounded high temperature cement made of the highest grade refractory materials obtainable and is especially adapted for the bonding of mason work, building of boiler furnaces in reverberatory and other types of high temperature furnaces. Blue Flame Cement fluxes on the face of the joints and when fluxed it forms a gas-tight joint.

RED FLAME (Dry) PLASTIC CEMENT: A mixture made from the very best heat-resisting materials and is used as a wash veneer on the face of the fire brick exposed to the products of combustion, prevents infiltration of cold air into the fire box, also the cracking, checking and spalling of fire brick.

WHITE FLAME INSULATING CEMENT is used for covering all exposed heating surfaces in Power Houses where high pressure steam is generated and superheat used, such as covering boiler shells, drums, heads, feed water heaters, valves, pipes, etc., also for insulating purposes between brick work and metal jackets on boilers and retorts, roofs of projected and extended furnaces.

Mōnō BOILER BAFFLING:
"It Hugs the Tubes"

The "MONO" (Monolithic) Baffle is composed of carefully compounded heat-resisting materials which do not require heat to make them set. It is built on an engineering basis by our own expert masons who have put them in boilers totaling over 100,000 horse power.

137

"MONO" Baffles are built on the correct angles according to conditions existing —such as the fuel and equipment used, rating desired, etc.

"MONO" Boiler Baffles are monolithic in structure and are tight, will not crack, spawl or check and do not disintegrate in service. Tubes can be withdrawn and replaced without injury to these walls. Combustion engineers at your service on request.

SEE OUR ADVTS. IN MECHANICAL ENGINEERING THE JOURNAL OF THE A.S.M.E.

Digitized by Google

QUIGLEY FURNACE SPECIALTIES COMPANY

Incorporated

26 CORTLANDT STREET, NEW YORK CITY

SALES OFFICES

BUFFALO BALTIMORE CHICAGO DENVER PHILADELPHIA PITTSBURGH PROVIDENCE
Representatives in 44 cities in the United States and Canada
FOREIGN OFFICES: London, Paris, Barcelona, Tokio

Makers of HYTEMPITE, INSULBRIX AND QUIGLEY POWDERED COAL SYSTEMS

THINGS YOU SHOULD KNOW ABOUT

HYTEMPITE

What is it?

HYTEMPITE is a scientifically compounded refractory plastic material for bonding fire brick and for kindred uses.

What does it do?

HYTEMPITE forms a lasting union between the materials to be joined, sets at normal temperatures and retains its strength regardless of the heat it is subjected to up to about 3000° F. or a temperature at which the best quality fire brick loses its strength and becomes soft.



In the Power Plant: Hytempite for Laying up Boiler Settings



Lining of 50 Ton Steel Ladle Laid up with Hytempite

Why is it better than fire clay?

HYTEMPITE is better than fire clay because fire clay and water has no binding strength, does not support the brick work or knit together the materials with which it is used, comes loose from constant expansion and contraction, disintegrates or falls out, forming crevices or cracks and does not maintain a gas- or air-tight structure.

Does it depend on heat for a bond?

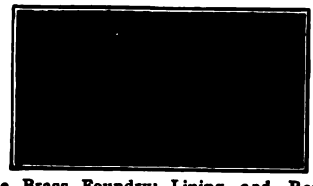
No, HYTEMPITE air sets at normal temperatures, making a wall of uniform strength throughout.

Will it stop or prevent air and gas leaks?

Yes, HYTEMPITE will not only stop these leaks, but will withstand the expansion and contraction caused by heat without loosening.

What proves its merit?

Over 80% of its sales are repeat orders.



In the Brass Foundry: Lining and Repairing Pit Furnaces



In the Gas Plant: Patching Cracked Retort with Hytempite

What are some of its uses?

1. For laying fire brick and tile.
2. For tightening old walls and arches, sealing openings in new walls, stacks, etc., to make them air-tight, lining doors, etc.
3. Hot patching in furnaces, gas retorts, etc.
4. Making special tile and shapes with crushed old fire brick, Carbosand, Ganister, etc.
5. Making rammed-in linings with your crushed old fire brick, Carbosand, Ganister, etc.
6. Bonding new courses or a veneer of fire brick to old walls.
7. Preventing leaks between bricks and iron work.
8. As a wash for surfacing brick work.
9. As a grout diluted or neat, according to requirements.
10. For lining ladles.
11. For patching or building up tuyeres, etc., etc.

SEE OUR ADV'T IN MECHANICAL ENGINEERING THE JOURNAL OF THE A.S.M.E.

Digitized by Google

QUIGLEY FURNACE SPEC. CO., INC. NEW YORK, N. Y.

INSULBRIX

KEEP HEAT IN OR OUT

A specially prepared cellular, insulating, refractory brick for use in boiler settings, brick kilns, bake ovens, steam drums, metallurgical furnaces, blast furnaces, electric furnaces, annealing furnaces, hot stoves, in steel plants, etc. A brick as well as an insulator.

Among the many strong points that recommend its use are:

Low Thermal Conductivity. One inch of **INSULBRIX** is equal to 6 to 10 times the same thickness of fire or red brick, depending upon the conditions, such as furnace temperature, conductivity of other brick used, etc.

High Heat Resisting Qualities. As the fusing point of **INSULBRIX** is over 2900 degrees F., and no shrinkage is shown at 1800 degrees F. (and even as high as 2200 degrees F., the shrinkage is extremely small), they can be used very close to the high heat zone, as they will stand up in case the fire brick becomes worn thin.

High Crushing Strength. As **INSULBRIX** have a crushing strength of over 600 lbs., to the square inch (40 tons per square foot) they can be used where the thrust of an arch or heavy weight is encountered, permitting thinner walls and simplifying and cheapening furnace construction.

High Tensile Strength and standard shape permit their being tied into fire brick walls, and not used merely as a veneer or division course, but as an integral part of the furnace wall.

Firm Surface and Rugged Structure enables their use in place of fire or common brick as an outside course.

True to Size and Shape. All **INSULBRIX** are formed and repressed before burning so as to give good square corners, allowing them to be laid in walls brick to brick with very little **INSULBRIX** cement, a sufficient quantity of which (to which water only is added) is furnished by us.

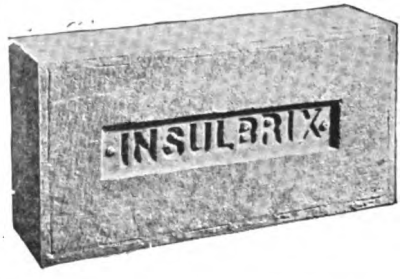
Low Permeability. Owing to the fact that **INSULBRIX** are close grained and have no artificial porosity or large voids and no shrinkage, air leakage is minimized, and the penetration of hot gases under forced conditions is prevented.

High Salvage Value or recovery of used **INSULBRIX** when doing repairs is possible owing to their rugged structure.

Weight approximately 3¼ lbs., or less than one half the weight of the ordinary fire brick.

INSULBRIX are made in standard firebrick sizes and special shapes by our patent process of Insuline, which is a natural, cellular, refractory material, composed of diatomateous silica, which has the highest insulating value of any known natural refractory material, due to the diatomes containing thousands of microscopic air cells. **INSULBRIX** are formed and burned at a temperature which insures their retaining their insulating value.

How to Lay. Mix the **INSULBRIX** cement as furnished with a sufficient quantity of water to form a thin batter, dip the **INSULBRIX** into water and then immediately into the cement batter, rubbing together to make a close joint. The brick may be cut in the ordinary manner, or can be very easily sawed to any desired size or shape when very accurate fitting is necessary.



INSULBRIX Cement. For use wherever an insulating cement that will not shrink when subjected to a high temperature is desired, and in places where it is impossible to use **INSULBRIX** on account of their form. Has the same heat retarding value or insulating properties as **INSULBRIX,** and should be used for laying same. Can be used to make special tile, surfacing walls, lining doors, etc.

INSULINE (Calcined). Used as a filler in places where a dry ground insulating material is subjected to high temperatures, such as between walls of furnaces or ovens Has the same heat retarding and insulating properties as **INSULBRIX.** Can be mixed with cement or any other binder and not spoil the set of the binder.

INSULINE (Uncalcined). Used for insulation in any place where comparatively low temperatures are encountered such as bake ovens, japan ovens, drying ovens, fireless cookers, safes, etc. Has a higher insulating value than our calcined material, but should not be used for high temperatures.

Information regarding the application of our materials to furnaces, ovens, and other structures will be furnished by our experienced furnace engineers upon application. Sample will be sent upon receipt of information and request.

(See page 129 for additional products of this Company)

Digitized by Google

LOOMIS-MANNING FILTER DISTRIBUTING CO.

MAIN OFFICE: 1439 So. 37TH STREET, PHILADELPHIA, PA.

BRANCH OFFICES IN NEW YORK, BOSTON, BALTIMORE

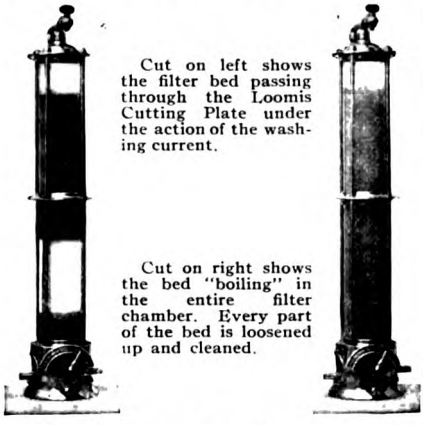
PRODUCTS:

Filters for cleansing and purification of water. Water rendered bright, clear, free from matters in suspension, free from odor, taste or iron stain and safe for all purposes.

DESIGN—LOOMIS-MANNING FILTER:

It is evident that a filter must be able to cleanse the filter bed thoroughly, ridding itself of the matters extracted from the water in the process of filtering.

This thorough cleansing is accomplished by passing the filter bed through the Loomis Cutting Plate by reversing the current of water through the filter. The action is shown by the cuts below.



Cut on left shows the filter bed passing through the Loomis Cutting Plate under the action of the washing current.

Cut on right shows the bed "boiling" in the entire filter chamber. Every part of the bed is loosened up and cleaned.

The bed then agitates in a space twice as great as it occupied when filtering. The filtering material is a uniform size from top to bottom and every particle is in motion when washing.

This filter is also unique because the filter bed rests on a *sand tight* screen system extending over the *whole area* of the filter chamber. This makes the filtration (and also washing) uniform over and throughout the *entire filter bed.*

Control of Filter:

The cleansing is brought about by moving one lever operating the Manning Single Controlling Valve. Control is accurate and sure.

Substantial Construction:

1. Outside shell, stands and grates supporting screens are cast iron. Outside shell made in sections.

2. Manning Single Controlling Valve, solid bronze throughout.

3. Loomis Confining Plate, placed at top, prevents entrance of large matters and loss of filter bed when washing. Loomis Cutting Plate, to make cleansing effective (see cuts). Screens at bottom, supporting filter bed, are sandtight.

4. All plates and screens, perforated copper reinforced by cast iron grates.

5. Piping, galvanized iron or brass, as desired.

6. Filtering material, finest grade of crushed quartz sand or specially prepared bonechar to meet water conditions.

7. Filters tested for 100 lbs. pressure. Special construction for higher pressures if required.

8. Workmanship, expert and accurate.

SIZES, CAPACITIES, ETC.

Style L, Single Cylinder Filter and Style M, Double Cylinder Filter*

Filter No. Style L or M	Inlet and outlet, inches	Waste, inches	Capacity, gals. per minute
17	3/8	3/8	1 1/2 – 3
27	3/4	1/2	2 – 4
37	1	3/4	4 – 8
47	1 1/4	3/4	6 – 12
57	1 1/2	1	8 – 16
67	1 1/2	1	11 – 22
77	2	1 1/2	15 – 30
87	2 1/2	2	25 – 50
97	3	3	50 –100
107	4	3	75 –150
112	4	3	100 –175
117	5	4	125 –200

* Capacities depend on condition of unfiltered water and the requirements of service. Double Cylinder filter has not a greater capacity than same size Single Cylinder filter, but gives greater refinement and removes odor, taste and iron stain.



Style L
Single Cylinder

Style M
Double Cylinder

Digitized by Google

THE PERMUTIT COMPANY

440 FOURTH AVENUE, NEW YORK CITY

BRANCH OFFICES

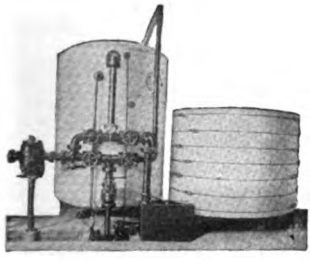
ALBANY, N. Y., 310 Journal Company Building
BOSTON, MASS., 10 Milk Street
BUFFALO, N. Y., 304 Brisbane Building
CHATTANOOGA, TENN., 435 Volunteer State Life Building
CHICAGO, ILL., 208 South LaSalle Street
KANSAS CITY, MO., 507 Lathrop Building
LOS ANGELES, CAL., 404–5 Wright-Callender Building
MINNEAPOLIS, MINN., 1046 McKnight Building
PITTSBURGH, PA., 921 Union Arcade
PHILADELPHIA, PA., 311 Widener Building

AGENTS

ST. LOUIS, MO., Reeves & Skinner Machy. Co., 2211 Olive St.
HAMILTON, ONT., CANADA, W. J. Westaway Co., Main & McNab Sts.
MONTREAL, QUE., CANADA, W. J. Westaway Co., 400 McGill Bldg.
WINNIPEG, MANITOBA, CANADA, Stanley Brock, Ltd.

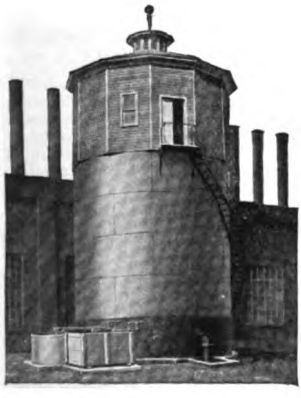
WATER SOFTENERS AND FILTERS:

We manufacture all types of apparatus for the treatment of water for any purpose, and maintain a special research laboratory for the investigation and solution of industrial problems.



TO REMOVE HARDNESS:

Permutit Zeolite Softeners, Lime-Soda Softeners of Intermittent or Continuous types, Heater Lime-Soda Softeners, Lime-Barium Cold or Heater Softeners, designed to fulfill any requirement and fabricated of best materials and highest grade of workmanship.



FILTRATION:

Permutit Pressure and Gravity Sand Filters for the removal of suspended matter; Special Filters to remove Oil, Chlorine, Ammonia and other impurities from water.



SPECIAL APPARATUS:

Permutit Filters, Aerators and specially designed equipment to remove Iron and Manganese; complete equipment for Filtration Plants and everything for the treatment of water to render it pure, clear and scale-free.

SERVICE:

A staff of experienced engineers is maintained constantly in the field to render service to our customers.

SEE OUR ADVTS IN MECHANICAL ENGINEERING THE JOURNAL OF THE A.S.M.E.

Digitized by Google

THE REFINITE COMPANY

REFINITE BLDG., OMAHA, NEB.

Member Associated Manufacturers of Water Purifying Equipment

Mines and Works, Ardmore, S. D. Equipment Assembling Factory, Omaha, Neb.

Water Rectification
Manufacturers of Refinite (Zeolite) Water Softeners, Booth Lime-Soda Water Softeners, Refinite Rapid Pressure Filters

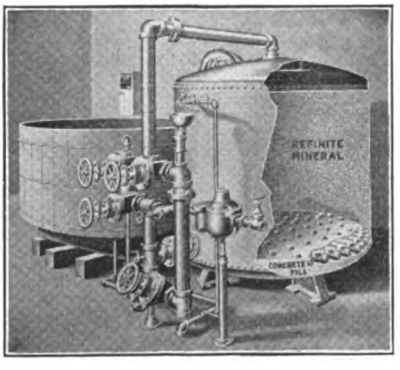
CHICAGO—Special Display Rooms—908 S. Michigan Ave.
NEW YORK, 543 Cortlandt Bldg., 30 Church St. SAN FRANCISCO, 417–421 Call Bldg.

THE REFINITE WATER SOFTENER is the only system utilizing nature's own water softening mineral, Refinite. It attaches to the cold water supply line.

Refinite mineral softens water through an exchange of its sodium base for the calcium and magnesium hardness present in the water. This is accomplished in the Refinite system as the water passes through a bed of the mineral in a container.

The water is softened to zero hardness and normal variations in the composition of the water do not affect the results of the treatment.

The sodium component of the mineral, when exhausted by the softening process, is renewed by simply allowing salt water to stand in the container six or eight hours. Exactly the opposite



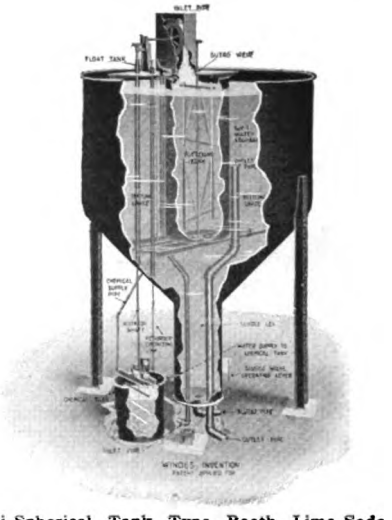
Refinite Water Softener

of the softening action occurs, the sodium from the salt solution being exchanged for the hardening salts taken up by the mineral. Renewal is usually done at night. The brine is then flushed out and the mineral is again ready for a capacity run of softening.

Refinite systems are built in various sizes and two or more containers or units may be connected to increase the total capacity They occupy very little space, require no expert supervision, are inexpensive to operate and the sodium component of the mineral may be renewed regularly for years without marked depreciation of the mineral.

Because of its absolute dependability for softening water to no hardness, its compactness and its ease and small cost of operation, the Refinite system is highly endorsed by textile mills, laundries, hotels, hospitals, institutions, food factories, bottling works, tanneries, steam power and central heating plants, restaurants, beauty parlors and homes the country over.

THE BOOTH LIME-SODA WATER SOFTENER is designed primarily for railroads, municipalities and the larger steam power and central heating plants. Among the advantages of the Booth are continuous feeding and proportional regulation of chemicals at the ground level, and automatic control of the measuring and feeding of chemicals. The systems are built in the standard flat-bottom and our patented coni-spherical tank types.



Coni-Spherical Tank Type Booth Lime-Soda Water Softener

The latter type eliminates the manifold sludge system, has a very slow rate of up-flow and a large storage capacity above the outlet pipe. Underneath its tank is room for the chemical mixing apparatus, and a housing built around the supports affords protection for the machinery and the piping.

Booth systems have proven for their users the most efficient and economically operated means to boiler feed economy.

Refinite Rapid Pressure Filters are the sand-and-gravel type, designed for use where elimination or reduction of impurities other than calcium and magnesia hardness is required.

Refinite and Booth systems are installed only after analyses of the water by our chemists.

Write our nearest district office for full information. No obligation.

Digitized by Google

WM. B. SCAIFE & SONS CO.

Founded 1802

OAKMONT, PA.

PITTSBURGH OFFICE
First Nat'l Bank Bldg.

NEW YORK OFFICE
26 Cortlandt Street

CHICAGO OFFICE
First Nat'l Bank Bldg.

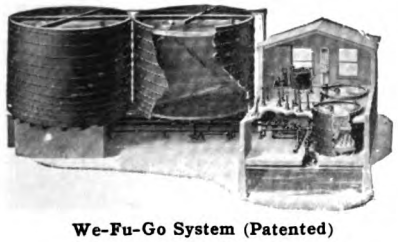
Water Purification for all Purposes: Continuous and Intermittent Water Softening and Purifying Systems; Pressure and Gravity Filters and Filtration Systems

SCAIFE WATER SOFTENING AND PURIFYING SYSTEMS:

The fundamental features of all our designs of systems are—accurate chemical treatment, thorough mixture of reagents with water, accelerated chemical reaction, rapid sedimentation, and perfect clarification. Design for each installation and performance guarantees are based upon scientific investigation of water supply and uses, supplemented by analysis and treatment of water in own laboratory.

We-Fu-Go System—(Intermittent): In this system definite quantities of water are treated, therefore accuracy of treatment can be maintained and uniform water obtained regardless of variations in quality of raw water or rate of use.

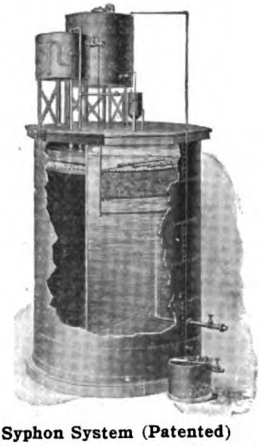
Consists essentially of two or more reaction and settling tanks, which also act as storage tanks, fitted with mechanical stirring devices operated by power, a small reagent mixing tank, means for introducing the reagents into the reaction tanks, and a quartz filter of either gravity or pressure type. Built for any capacity.



We-Fu-Go System (Patented)

Syphon System—(Continuous): An automatic system not dependent upon moving mechanical devices for reagent introduction. The water enters a receiving tank to which is connected a syphon, into the long leg of which smaller syphons connect from the solution tanks. Reagents introduced during the period of syphon discharge. This system can be arranged to be operated either from the ground or from the top.

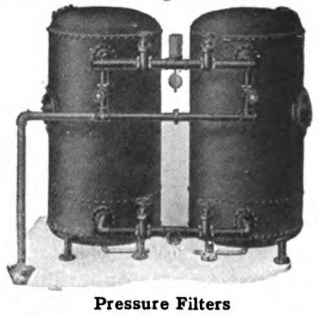
In addition we manufacture three other standard continuous systems and design special systems where required.



Syphon System (Patented)

PRESSURE AND GRAVITY FILTER SYSTEMS:

Pressure Filters are adaptable for every purpose and are built in capacities from 20 gallons per hour upward, to withstand any required pressure. When operated in pairs, each filter is cleaned with filtered water, one filter furnishing the water for cleansing the other.



Pressure Filters

Gravity Filters are built in units with capacities varying from 8,000 to 1,000,000 gallons per 24 hours each. Combinations for practically any capacity with required sedimentation can be furnished.

Patented brass conical strainers and patented valveless coagulant feed apparatus are special features embodied in these filters and filter systems.

SEE OUR ADVTS. IN MECHANICAL ENGINEERING THE JOURNAL OF THE A.S.M.E.

(See Part VII for additional products of this Company)

Digitized by Google

STANDARD WATER SYSTEMS CO.

HAMPTON, N. J.

Engineers and Manufacturers

NEW YORK OFFICE: 50 CHURCH STREET, NEW YORK CITY

Manufacturers of Standard Multi-coil Evaporators and Multiple Effect Plants, Standard Multi-coil Feed Water Heaters, Standard Multi-coil Distillers, Fuel Oil Heaters, Grease Extractors, Condensers, "Tripure" Aerated Water Stills for Land and Marine Purposes

SALT WATER DISTILLATION:

On ship-board, or in stationary plants, where sea water is distilled, the "STANDARD" method of distillation is ideal. The salt water is rendered absolutely pure, free from salt and all other impurities, and where the water is to be used for drinking purposes, it is made deliciously sweet and palatable by our patented method aeration.

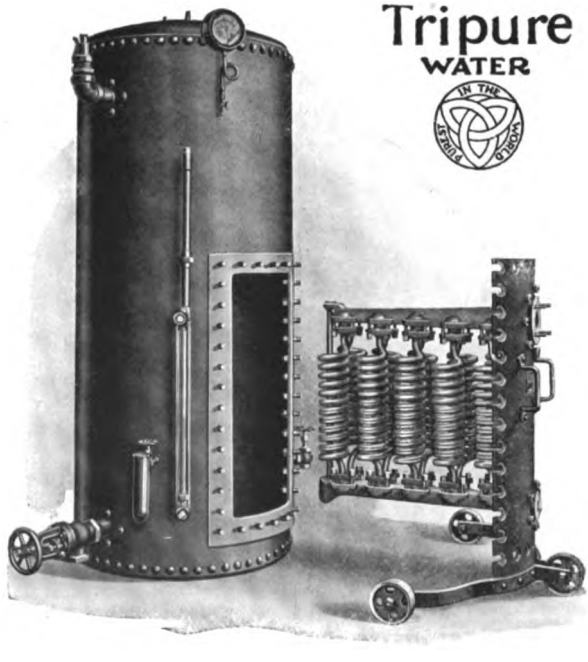
"TRIPURE" apparatus is specially designed for steamships and harbor vessels.

In our multiple effect plants for steamers, etc., we produce water at exceedingly low cost, which makes it practical and economical for boiler feed. Water from the last effect is introduced to our Aerating Condenser, thereby being made desirable for drinking purposes. Such a system is installed at Quarantine, Port of New York.

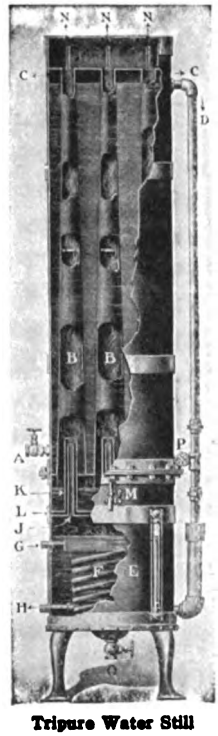
TRIPURE WATER STILL:
(Patented)

Entirely automatic in operation. Built in various sizes and any capacity for distilled and aerated water.

144



Standard Multi-coil Evaporator, with entire heating unit withdrawn for internal inspection or cleaning. Facilitated by our patented RADIAL door.



Tripure Water Still

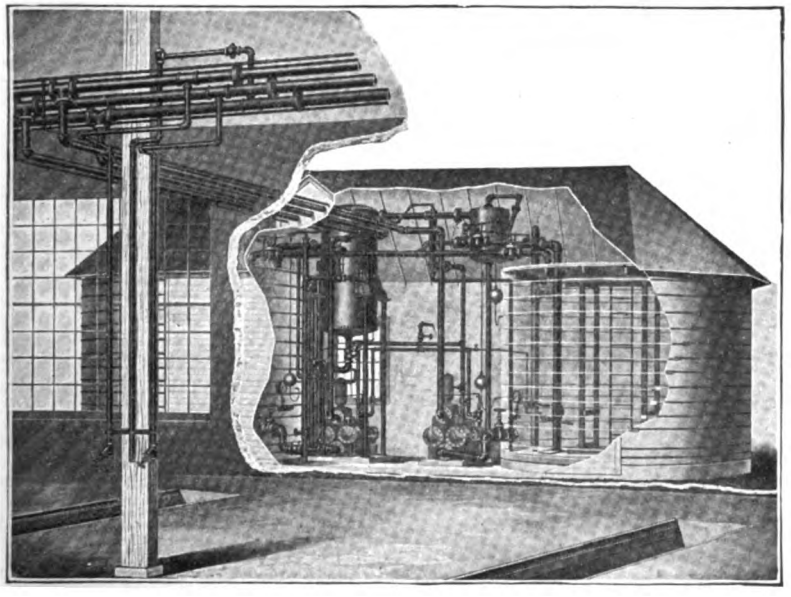
Digitized by Google

NATIONAL BOILER WASHING CO.

OF ILLINOIS

RAILWAY EXCHANGE, CHICAGO, ILL.

Contractors for General Pipe Work in Railway Terminals



NATIONAL HOT WATER WASHOUT AND FILLING SYSTEMS FOR LOCOMOTIVE BOILERS:

By the use of this system the blown-out water from a locomotive is saved and used for washing this or other locomotives. The steam from the blown-out water is saved and used to heat fresh water to fill this or other locomotives. Washing with hot water prevents tearing the boiler apart by rapid change of temperature Filling with hot water means getting up steam more rapidly. Both mean very decided saving in coal, water and time.

Digitized by Google

H. S. B. W.-COCHRANE CORPORATION

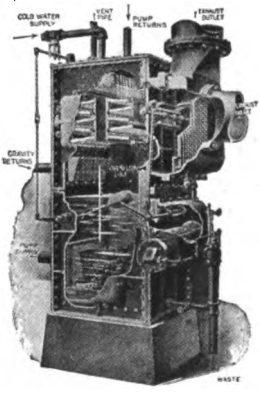
Formerly Harrison Safety Boiler Works

PHILADELPHIA, PA.

Atlanta	Dallas	New Orleans	San Antonio	Calgary
Baltimore	Denver	New York City	San Francisco	Vancouver
Birmingham	Detroit	Omaha	Seattle	Winnipeg
Boston	Houston	Pittsburgh	Syracuse	Paris
Charlotte	Indianapolis	Portland	Tucson	Calcutta
Chicago	Kansas City	Richmond	Toronto	Havana
Cincinnati	Los Angeles	St. Louis	Montreal	Shanghai
Cleveland	Minneapolis	Salt Lake City	Halifax	

Manufacturers of the celebrated Cochrane Lines, including Open Feed-Water Heaters, Steam Stack and Cut-Out Valve Heaters and Receivers, Metering Heaters, and Independent Meters, Sorge-Cochrane Hot Process Water Softeners, Steam and Oil Separators, and Multiport Back Pressure, Atmospheric Relief, Flow and Check Valves

THE COCHRANE OPEN FEED-WATER HEATER:



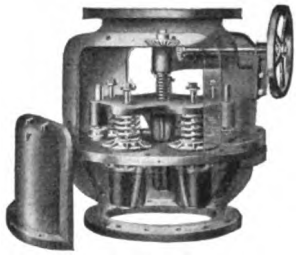
The Cochrane Open Feed-Water Heater utilizes exhaust steam to heat the boiler feed to 212° F. One per cent. of fuel is saved for each 11° F. rise in temperature.

The Cochrane Heater serves as a hot well or return tank and as an automatic cold water regulator. Extra water storage capacity can be provided as required. The steam-stack and cut-out valve type shown above, is fitted with an extra large separator to purify the steam going to the heating and drying system.

Ask for our Book on "The Profitable Utilization of Exhaust Steam."

THE COCHRANE MULTIPORT BACK PRESSURE VALVE:

The Cochrane Multiport Back Pressure Valve differs from the ordinary back pressure valve in that a number of small disks are used instead of one large disk, thus reducing the size, weight and travel of the disks. Noise, hammering and risk of sticking are thus eliminated.



The back pressure is controlled easily by a hand-wheel, or from a distance by rods, chains, electric motor, etc.

All sizes, for vertical, angle and horizontal pipes.

Ask for "Multiports and Their Uses."

THE COCHRANE STEAM SEPARATOR:



The Cochrane Steam Separator stops slugs of water brought over from the boiler, or due to condensation in the steam line.

The Cochrane Receiver Separator shown above, stores steam close to the throttle, equalizing the flow through the steam line and raising the average pressure in the steam chest. It is thus possible to use smaller piping and fittings, reducing first cost and loss of heat by radiation. Cochrane Receiver Separators have proved very effective in eliminating vibration.

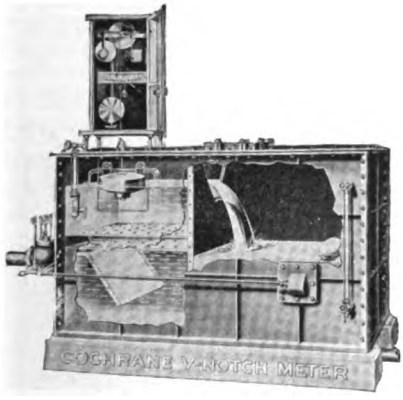
Our "Separator Book" will be sent upon request.

Digitized by Google

H. S. B. W.-COCHRANE CORPORATION PHILA., PA.

Formerly Harrison Safety Boiler Works

COCHRANE V-NOTCH METERS:

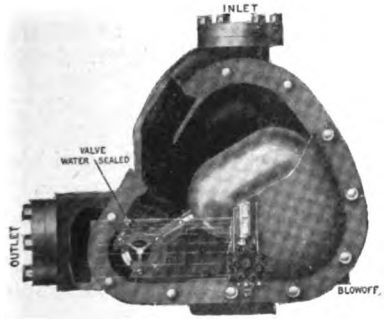


Cochrane V-Notch Meters are used for measuring the steam consumption of engines and turbines, returns from heating systems, boiler blow-off, etc. The accuracy is guaranteed to be within 1½ per cent. of actual weight, variations in the temperature of the water not to exceed 25° F. above or below the specified temperature.

The Cochrane Metering Heater heats water to 212° F. or higher and also meters it.

Ask for "Finding and Stopping Waste in Modern Boiler Rooms."

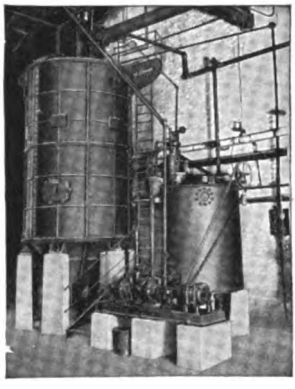
THE COCHRANE MULTIPORT DRAINER:



The Cochrane Multiport Drainer removes condensate or drips from heating or drying coils, radiators, jackets, low-pressure steam and oil separators, etc. The hollow cylindrical valve is absolutely balanced, has large ports and has large capacity with low operating pressure. There are no stuffing boxes, packings, springs or links. For pressures up to 50 lbs. per sq. in.

Ask for "Drainer Bulletin."

THE SORGE-COCHRANE HOT PROCESS WATER SOFTENER:



The Sorge-Cochrane Hot Process Water Softener heats the water to 210° F. before the chemical reagents are added.

The chemical reactions are much more rapid and complete than in cold water, and the precipitates settle more rapidly. There is no after-precipitation in pumps, pipe-lines, heaters and economizers.

Complete protection to the boilers against corrosion and scale and the minimum amount of sludge-forming matter in the treated water are guaranteed.

Cold-Process Softeners are also supplied where the water must be softened cold.

Ask for the "Hot Process Softener."

SEE OUR ADVTS. IN MECHANICAL ENGINEERING THE JOURNAL OF THE A.S.M.E.

Digitized by Google

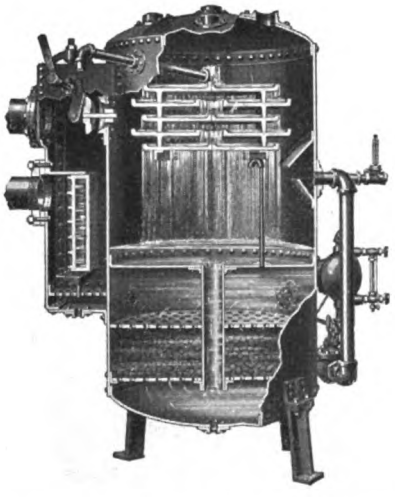
MILWAUKEE RELIANCE BOILER WORKS

MILWAUKEE, WISC.

Manufacturers of Feed Water Heaters, Gas Producers, Iron and Steel Tanks

"RELIANCE" FEED WATER HEATER, PURIFIER, FILTER AND RECEIVER:

Our heaters are built throughout in the most substantial and workmanlike manner. They have an extra large heating surface. They are very accessible for cleaning and parts replacement purposes, etc.



THE "RELIANCE" INDUCTION TYPE OPEN FEED WATER HEATER, PURIFIER, FILTER AND RECEIVER:

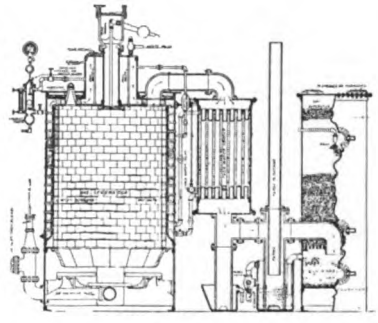
A heater containing all the better features of all other heaters without the faults and failures and incorporating improvement existent in none other. Special positive acting, non-clogging oil extractor.

Filter of the underfeed type assuring clean water, as by that method sediment cannot be disturbed by pump suction.

THE RELIANCE FEED WATER HEATER:

A Feed Water Heater, Purifier, Filter and Receiver that is different from the ordinary. Provided with an Oil Extractor that purifies.

Send for Catalogue.



SHARP BASSETT IMPROVED GAS PRODUCER:

A Gas Producer that combines simplicity of construction, convenience and ease of operation, economy and reliability under all operating conditions. Made in self-contained units of 25 to 300 H. P. combining in multiple unit plants in any size.

Constructed of the best materials and designed by experts. They show upon test the highest efficiency obtainable through any other power generating apparatus, and this at the lowest cost per unit of power delivered.

TANKS:

Steel Storage	Air Receivers
Pneumatic Pressure	Tanks with Coils

Tanks for:

Packing House	Chemical Works
Dye Plants	Creameries

We are also equipped to manufacture **special plate work** of every description.

Send for Catalogues.

Digitized by Google

OPEN COIL HEATER AND PURIFIER CO.

MAIN OFFICE & WORKS, INDIANAPOLIS, IND.

PHILADELPHIA OFFICE
Machinery Dept., THE BOURSE

BOSTON OFFICE
52 SUDBARY ST.

Manufacturer of the "Stickle" Open Coil Feed Water Heaters and Purifiers, Triplex Oil and Steam Separators, High and Low Pressure Steam Traps, Pump Governors, Pressure Regulators, Damper Control, Back Pressure Valves, etc.

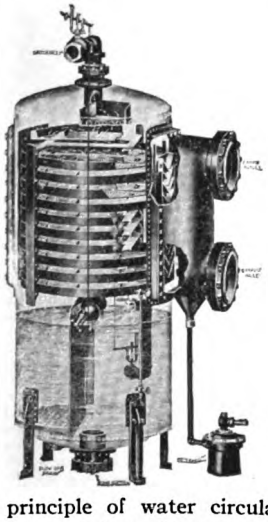
STICKLE VACUUM RADIATOR VALVE:



This valve is strictly mechanical and specific gravity governs its operation. The air rises to the surface and passes out through the opening at the top of the tube extending into the bucket. The small groove in the valve stem prevents air binding. There will be no water in the radiator with a differential between the radiator and the discharge.

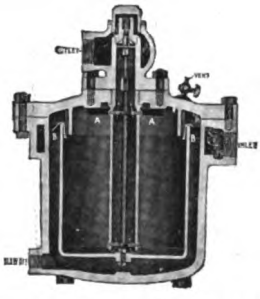
The larger sizes are especially adapted for draining blast coils using individual traps. This is the only vacuum system that will successfully drain paper machine dryers. Over 700 paper machines are equipped with this system.

THE NEW STICKLE FEED WATER HEATER AND PURIFIER:

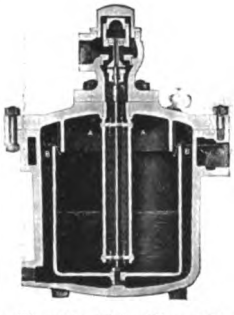


Our principle of water circulation in open coiled trays is used in our new heater. The shell of this heater is made of heavy steel to withstand any back pressure that is required in modern industrial heating and drying plants. No heater built up of cast iron flat plates is safe with a back pressure. Large units from 5,000 up to 15,000 H.P. are built in horizontal type.

STEAM TRAPS:



The Stickle Steam Traps are made in Class A high pressure, Class B low pressure Class T Thermic Vacuum and the New Pop Valve, a marvel in steam trap construction. The New Pop Valve Steam Trap has a valve area practically the same size as the pipe openings. It has eight times the capacity of the standard steam traps. It will operate at any pressure without change of valves.



The New Pop Valve Steam Trap

Get the descriptive matter on our full line of steam specialties.

Digitized by Google

THE NATIONAL PIPE BENDING CO.

MAIN OFFICE AND WORKS

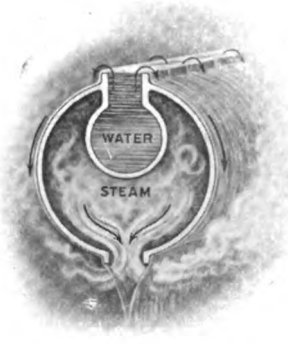
NEW HAVEN, CONN.

81 LLOYD STREET

Manufacturers of the National Coil or Closed Feed Water Heater. Instantaneous Hot Water Generators. The National Direct Contact Feed Water Heater and Purifier. National Storage Heaters. National Steam and Oil Separators. National Fuel-Oil Heaters. Fuel Oil Heaters and Coolers. Coils and Bends of Iron, Brass and Copper Pipe. Refrigerating Coils

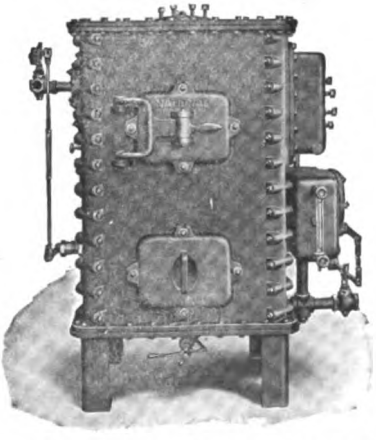
BOSTON, MASS. CLEVELAND, OHIO ST. LOUIS, MO. PITTSBURGH, PA. JACKSONVILLE, FLA. CHARLOTTE, N. C. WASHINGTON, D. C. SALT LAKE CITY, UTAH BUFFALO, N. Y. NEW YORK, N. Y. CHICAGO, ILL. PHILADELPHIA, PA.

NATIONAL DIRECT CONTACT FEED WATER HEATER:



150

The feed water is brought to high temperature by direct and actual contact with the exhaust steam, then freed from those impurities which are precipitated by heating, and, lastly, filtered before flowing to the pump. Combined in one apparatus are a Heater, a Purifier, a Storage Reservoir and an Oil Separator.



National Direct Contact Feed Water Heater

Water entering through regulating valve is distributed to the smaller or inner pipes which extend full length of heater. Overflowing the port at top, it passes as a thin film over entire outer surface of the large pipe It is here warmed by steam in the steam pipe, which practically surrounds the water pipe. The exhaust steam, after passing through a National oil separator, which forms a part of the heater, escapes from steam pipe through the port at bottom, and in passing through the curtains of water heats it by actual contact to exhaust steam temperature.

The heated water collects in the tray beneath the pipes and by means of a vertical pipe reaches the bottom of the heater, where the scale-forming substances are precipitated. The water then passes upward through the filter material to the hot storage chamber, from which the pure hot water flows direct to the pump. Described in detail in Catalog No. 52.

NATIONAL OIL SEPARATOR:



Patented May 21, 1912

This gravity-type oil separator absolutely removes all grease or cylinder oil from exhaust steam so that the condensation may be used for feeding boilers, in laundry or dyehouse service, ice making, or for similar purposes. It has a multi-ported baffle plate, each port having an individual baffle, a distinctive feature found only in the National Separator. The large capacity of this separator not only insures effective separation of oil from exhaust steam but also overcomes the pulsations of exhaust, giving an even flow of steam Described fully in Catalog No. 52 and Special Catalog

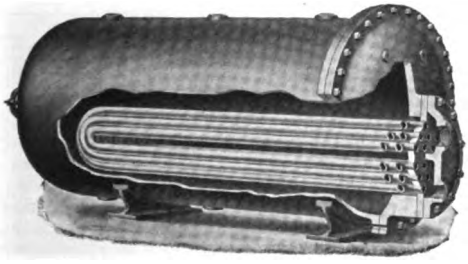
COILS AND BENDS:

Coils and Bends of Iron, Steel, Brass and Copper Pipe and Tubing.

Send for descriptive catalog.

Digitized by Google

THE NATIONAL PIPE BENDING CO. NEW HAVEN, CONN.



NATIONAL STORAGE HEATER:

This apparatus heats water either continuously or intermittently by live or exhaust steam, and stores it for either constant or occasional use.

It consists of a shell or tank containing a heating element, made up of bent pipe or tubing. Water from any source enters the bottom of the shell, is heated by steam in the heating element, and leaves at the top in quantities, and at intervals to meet the varied requirements.

The illustration shows the U-Bend type with cast iron shell, and heating element of bent copper tubes, with ends expanded into a steel tube-plate bolted on the outside of the head, and provided with a cast iron cover with suitable openings for the admission of steam and the removal of condensation.

The heating element is removable for inspection, repairs or substitution of a larger or smaller element when desired. It is placed in the lower part of the shell, where the entering water will come in contact with it, resulting in maximum efficiency in the transfer of heat. The area through the tubes is sufficient for unrestricted flow of steam and condensation.

Described in Bulletin No. 54.



NATIONAL COIL TYPE FEED WATER HEATER:

For use when the feed water need not be purified. In the National, the feed water is heated while being pumped through a coil of seamless-drawn copper tubing surrounded by exhaust steam. The water is absolutely free from even a trace of oil, for it does not come in contact with the exhaust steam. The copper has no effect on the water.

The enclosing shell is of cast iron or steel plate; it lasts indefinitely because the feed water cannot reach it.

The economy resulting from the utilization of exhaust steam varies from 8 to 13% of the coal burned, depending on conditions—temperature of feed water and boiler pressure; but other advantages are reduction of strains caused by feeding cold water, and increase in boiler capacity.

The National is safe—the coils are tested to 600 pounds water pressure, and the shell is subjected to exhaust pressure only.

More than 3,250,000 horse power of National heaters have been installed.

SEE OUR ADVTS IN MECHANICAL ENGINEERING THE JOURNAL OF THE A.S.M.E.

Described in Bulletin No. 53.

Digitized by Google

THE SIMS COMPANY

ERIE, PENNSYLVANIA

Manufacturers of Power Plant Appliances, Feed Water Heaters, Hot Water Generators, Tanks

"We Keep Others in Hot Water"

SERVICE:

Do you have your water heating apparatus fitted to the needs of your plant? Have you had the benefit of a specialist's advice in the selection and installation of your equipment?

The Sims Company's Engineers are masters in keeping others in hot water and you are welcome to avail yourself of this accumulated experience when your problem is the heating or cooling of water and other liquids.

We do not merely sell you a piece of apparatus but furnish you service that has been a source of satisfaction to "Sims" users since 1886.

FEED WATER HEATERS:

The Sims Closed Feed Water Heater is built of the best obtainable materials. The sizes range from 30 to 10,000 H. P. in the vertical or horizontal type.

152

This heater may be cleaned without breaking steam or water connections.

The Sims Open Feed Water Heater, filter and purifier is built with the same care and thought as the closed type. For the combined heating and purifying of feed water, this type of Sims Feed Water Heater has become standard equipment for a large part of the steam-using public. Its design and operation are simple. Its safety features provide against preventable accidents. Altogether, it is a machine designed for lasting, reliable service.

Sims Feed Water Heaters are in use in the power plants of well-known public service stations, municipal departments, industrial plants and institutional power houses.

HOT WATER GENERATORS:

We build two types of Hot Water Generators for supplying hot water in large quantities, an instantaneous generator and a circulating type. The tubes in these heaters are arranged in such manner so that the water extracts the maximum heat. They operate on live or exhaust steam and provide an economical source for hot water in large quantities.

We specially recommend their use in **hotels, hospitals, institutions, etc.**

CONVERTORS:

For heating large or small buildings, hot water is rapidly coming to the fore. It is easy to control, both locally and as a unit; its temperature is comparatively low; it can be carried to greater distances than steam with less loss and its maintenance is more simple and less expensive. For hot water heating, our convertors will be found ideally suited.

STEAM TUBE STORAGE HEATERS:

For plants requiring hot water for some particular process of manufacturing, we build a line of simple and strong storage heaters—capacities from 100 to 20,000 gallons per hour at a temperature of 50 to 180 degrees F.

For use in hospitals, institutions, laundries, hotels, office buildings, etc.

"SIMCO" BOILERS AND WATER HEATERS:

The Simco heaters are water tube boilers, designed to operate either with gas, coal or oil fuel and to heat from 300 to 4000 gallons of water per hour. They are for such services as hot water supply, hot water heating and steam heating.

In connection with these heaters, we make another type of boiler, using refuse, garbage and the like for fuel.

GAS ENGINE ECONOMIZER:

For heating water or generating low pressure steam, we have designed a type of heater to utilize the waste heat, heretofore lost, in the exhaust of internal combustion engines. This heater is not affected by the exhaust gases.

SIMS STEAM SEPARATORS:

Our separators are of the type designed to extract the moisture by centrifugal motion. They deliver DRY steam to your engine. The materials and workmanship entering into the construction of these separators are the best. "Sims" experience and reputation guarantee them.

We also make in the standard Sims quality:

Muffler Separators
Exhaust Heads
Oil Filters
Boiler Compound Feeders
Plain Tanks and Coil Tanks for Oil, Gas and Water

Send for Catalogues.

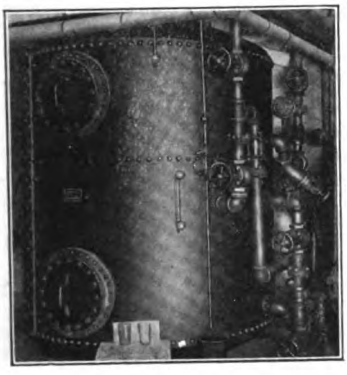
Digitized by Google

ARTHUR E. KRAUSE

MOUNTAIN LAKES, NEW JERSEY

KRAUSE DEMULSIFYING OIL ABSORBENT FILTERS:

For Purifying Emulsified Oily Condensate



Krause Absorbent Filter
6 feet in diameter, double chamber,
Exchange Court Building, New York

The only Filter completely removing all traces of emulsified oil from condenser and pipe returns, rendering water absolutely clear and safe for boiler feed.

Reduces Coal and Water Bills, Dispenses with Compounds, Keeps Boilers Clean, Improves Evaporation and Saves Boiler Repairs.

The heretofore acknowledged impossibility of removing the last few grains of merely mechanically filtered oil from condensate returns without resorting to more or less complicated methods has now been finally and satisfactorily overcome by means of the Krause process of demulsifying Absorbent Filtration.

This process has been successfully installed in numerous steam and power plants in New York City and vicinity. The impossibility heretofore of satisfactorily filtering such condensate was owing to the infinitesimally small size of the emulsified oil particles therein, which will readily pass through even the finest filter paper—hence the failure of all attempts to remove such fine oil globules by merely straining the condensate through any of the various kinds of Turkish toweling, burlaps, sand or other granular material.

It may be needless to mention to experienced engineers that where even small amounts of oil, just rendering the condensate slightly opalescent, are returned to the boiler continuously, the total amounts of oil thus accumulating in the boiler from time to time soon render such feed water dangerous by depositing a non-conducting film of oil within the boiler tubes, plates, or boiler sheets. This is well known according to experience in the past and has frequently resulted in burnt water tubes, bulged or bagged boiler sheets and even serious explosions.

The success of the Krause demulsifying process of filtration through an insoluble absorbent material in removing the last traces of oil and thereby rendering the condensate pure, clear and safe depends upon the remarkable and energetic physical property of absorbing emulsified oil from condensate when brought into contact with it, and not upon any mere mechanical straining action.

This absorbent material is insoluble and will last from eight to twelve months before requiring renewal in the filter.

By means of a special rough oil skimming device these filters will also draw off completely the coarse or floating oil from the condensate so that such oil may also be used over again.

If the purest and softest possible feed water for your boilers is desired; no better feed water than that produced from your own return condensate can be obtained, nor so simply and economically.

There are no chemicals, mixing tanks nor expert attention required.

Digitized by Google

WARREN WEBSTER & COMPANY

Established 1888

MAIN OFFICE AND WORKS, CAMDEN, NEW JERSEY

BRANCH OFFICES IN THE FOLLOWING CITIES

NEW YORK	NEW ORLEANS	WILKES-BARRE	CHARLOTTE
PITTSBURGH	DENVER	ROCHESTER	BUFFALO
INDIANAPOLIS	DETROIT	BOSTON	DALLAS
LOS ANGELES	MILWAUKEE	CINCINNATI	GRAND RAPIDS
SAGINAW	CHICAGO	KANSAS CITY	OMAHA
PHILADELPHIA	ST. LOUIS	SAN FRANCISCO	TOLEDO
ATLANTA	MINNEAPOLIS	WASHINGTON, D. C.	BALTIMORE
CLEVELAND	SEATTLE	ATLANTIC CITY	

Sole Representatives and Manufacturers for Canada

DARLING BROTHERS, LTD., MONTREAL

WINNIPEG CALGARY TORONTO VANCOUVER MONTREAL HALIFAX OTTAWA

THE ATMOSPHERIC STEAM HEATING CO., LTD., LONDON, ENGLAND

WEBSTER SYSTEMS OF STEAM HEATING:

Vacuum Modulation Hy-Lo

Having been pioneers in Vacuum Heating and before the engineering world for 33 years there are few in the line who do not know the reputation we have established for excellence of materials and service.

The devices which go to make up a **Webster Vacuum** or **Modulation System** are varied in construction and operation so as to meet all requirements, and standing back of each Webster Installation as we do, it is but natural that we prefer to co-operate with the Architect, Consulting Engineer, Heating Contractor or Owner in the design and construction of the apparatus. The Webster Appliances are furnished as a complete System. We are at your service with a trained engineering organization, and have made fuel conservation a life-study.



Webster Sylphon Trap
No. 522—Interior View

The Webster Sylphon Trap is by far the best water and air relief trap on the market, and by means of special Sylphon Attachments, the Sylphon principle can now be applied to almost any obsolete or less satisfactory valve. The substitution of Sylphon for the old working parts takes but a few minutes and the old trap body is utilized without disturbing the pipe connections.

The Webster Modulation Valve is made in several types also and can be applied to the supply connection of any kind of radiating surface using steam as a heating medium.

Universal joint—Extended stem valves for radiators beneath seats or behind grills, chain control for overhead radiators or coils have been perfected to a point of absolute success.



Webster Modulation Valve
Type N—Interior View

The several types of Webster Modulation Valves are used successfully with or without a vacuum pump according to the nature of the building or buildings in which they are installed, and where applied and operated according to our instructions make it possible to modulate the temperature of a room by measuring the quantity of steam admitted.

The removal of air and water of condensation from radiators, coils or piping is accomplished successfully without steam leakage. The Webster Sylphon Trap, the most efficient device for that purpose, operates at any pressure or vacuum from 15 pounds above to 15 inches below atmospheric pressure, being compensated for pressure.

A perfect balance within this System can be maintained by the application of our Hy-Lo method with which a high vacuum can be carried on trunk lines and lower vacuums on branches, making lifts and difficult situations easy to overcome.

For Convenience, Economy and Efficiency in heating, there is no better method than "The Webster" and with our experienced Service Department Engineers, backed by our ability to make good, the slogan that "The Webster Guarantee is the Owner's Insurance Policy" is a fact and not a theory.

Write for illustrated bulletins containing complete information.

Digitized by Google

WARREN WEBSTER & CO. CAMDEN, N. J.

WEBSTER FEED-WATER HEATERS:

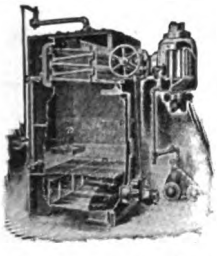
All Webster Feed-water Heaters embody the following special features:

(a) Heating Trays of perforated sheet metal, light, easy to clean, durable and permitting the most intimate intermixture of steam and water because of the small perforations obtainable by the use of such materials.

(b) Open Sink Pans (instead of hollow floats)—for automatically controlling water inlets and overflow—positive in action, cannot become inoperative except by abuse.

(c) Complete segregation of oil separator drips from any connection with other openings into the Heater, thus preventing all contamination otherwise caused by accident or negligence.

(d) Vacuum Principle, by which the Heater assists the passage of steam into itself, thereby reducing back pressure upon engines.



Webster Feed-water Heater Class EB Cut-out Type Interior View

Webster Heaters save (1) Fuel (usually from 10 to 17%), (2) Water (usually from 10 to 14%) as compared with the use of a closed type of heater or with no heater whatever, (3) Boiler repairs due to boiler strains, and (4) Boiler cleaning expense due to their action as Water Purifiers.

WEBSTER OPEN FEED-WATER HEATERS are built in all types and sizes for any conditions of service, space, head room, etc. They can be furnished either Standard Type (induction principle with Oil Separator attached to Heater shell) or Preference Type (the most improved form of Cut-out Heater using a Gate Valve in connection with an Oil Separator of ample size to purify all steam passing through the exhaust main to both the Feed-water Heater and to a Heating or Drying System or to Low Pressure Turbines).

Class "EB"—300 to 12000 horsepower capacities—vertical rectangular pattern —upward flow filtration.

Class "EC"—500 to 7000 horsepower capacities—vertical rectangular pattern —upward flow filtration.

Class "ED"—500 to 15000 horsepower capacities—horizontal cylindrical pattern (particularly adapted for low head-room) —upward flow filtration.

Class "EF"—50 to 350 horsepower capacities—vented rectangular one-piece body type—either upward or downward flow filtration as required.

Write for Bulletins 100-1 and 102.

WEBSTER STEAM AND OIL SEPARATORS:

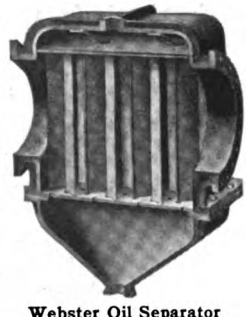


Webster Steam Separator

Webster Steam Separators are made in plain and receiver types for horizontal, vertical or angle flow and for high or low pressure.

Write for Bulletin 301.

Webster Oil Separators are made in plain and receiver types, for horizontal, vertical or angle flow and for pressure, atmospheric or vacuum conditions. Condensation from steam passing through these separators is safe for boiler feed or manufacturing purposes.



Webster Oil Separator Interior View

Write for Bulletin 401.

Digitized by Google

C. F. BRAUN & CO.

SAN FRANCISCO, U. S. A.

Manufacturing Mechanical Engineers



Braun Type "E" Heat Exchanger

FLUID HEATERS, COOLERS AND HEAT EXCHANGERS FOR ALL INDUSTRIAL PURPOSES:

BRAUN HEAT EXCHANGERS include a very complete line of tubular apparatus for special industrial service such as heating oil with steam, cooling oil with water, heating or cooling sugar refinery juices, cooling distilled water with raw water, exchanging heat between oils, condensing vapor from oil refinery stills, and, in fact, to meet any conditions requiring the transferring of heat between fluids or vapors.

BRAUN TYPE "E" EXCHANGERS are employed only for transferring heat between a vapor and a fluid, the fluid flowing through the tubes in the correct number of passes to meet the required conditions, and the vapor filling the shell and surrounding the tubes.

BRAUN TYPE "ETL" EXCHANGERS with longitudinal baffle and transverse turbulence plates are used for all conditions requiring the transfer of heat from a liquid to a liquid, one liquid being passed through the tubes and the other passing IN THE OPPOSITE DIRECTION along the outside of the tubes. The longitudinal baffle closely fitting slots in the shell directs the flow of the liquid on the outside of the tubes.

Efficiency Unequaled by any type of fluid to fluid heat exchanger is attained by the use of the transverse turbulence plates which produce convection currents with consequent high heat transfer rates.

A Complete Standard Line of Heat Exchangers for Water, Oils, Juices and other fluids.

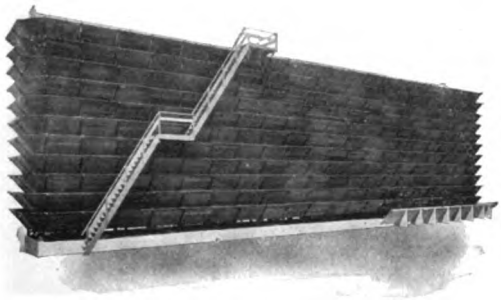


Braun Type "ETL" Heat Exchanger

SEE OUR ADVTS IN MECHANICAL ENGINEERING THE JOURNAL OF THE A.S.M.E.

Digitized by Google

C. F. BRAUN & CO. **SAN FRANCISCO, U. S. A.**



BRAUN COOLING TOWERS:

The Braun Cooling Tower is a substantial outdoor structure for cooling water by exposing it to the atmosphere, and consists of a structural frame, to which is secured a water distributing system on the top, a series of decks intercepting the falling water and exposing it to the air, and louvres, to permit of the free passage of air through the falling water, but to prevent the water being carried away by the air currents. It is without fans and the only power involved is that required for pumping the water, against a head of about 30 feet, to the top of the tower.

Their Field of Use includes supplying water for steam condensers, ammonia condensers in refrigerating plants, distillers in oil refineries, jackets of internal combustion engines and air compressors, electrical transformers, and for diverse purposes in industrial plants.

Results Obtainable are limited only by the wet bulb temperature which, in the United States, seldom exceeds 70° F. in any locality, even under the most unfavorable conditions, and averages more nearly 50° F. Without the use of prohibitively large towers final water temperatures can be obtained approaching the wet bulb within 5° to 10° F. Many BRAUN towers installed in the hot interior valleys of California are consistently, during the hot summer months, delivering water at a temperature of 70° to 75°, although the temperature of the surrounding air is upwards of 100° F.

Strictly Scientific Principles are employed in the BRAUN cooling tower and its design. Construction and selection for varying conditions requires as much mechanical skill and practical experience as is required for the production of steam engines or ice machines. Cooling is accomplished both by direct heating of the air and by evaporation of a portion of the water, the problem being a complicated one, involving both temperature and vapor pressures.

Loss of Water is, by the use of the large sloping louvres, reduced to an average of between two to three percent. These louvres act as separators, the entrained water being thrown against them by the air currents and drained back on to the decks.

California Redwood is used exclusively and is the most resistant of all woods to decay. All bolts, tie rods, and similar fastenings are of brass.

Unit Panel Construction permits of rapid assembly in field with unskilled labor.

The Braun Mill in the heart of the redwood forest produces these towers on a manufacturing basis.

Large Stock of fabricated parts ready for immediate shipment includes sizes 2 to 80,000 G. P. M. capacity.

Digitized by Google

MANISTEE IRON WORKS COMPANY

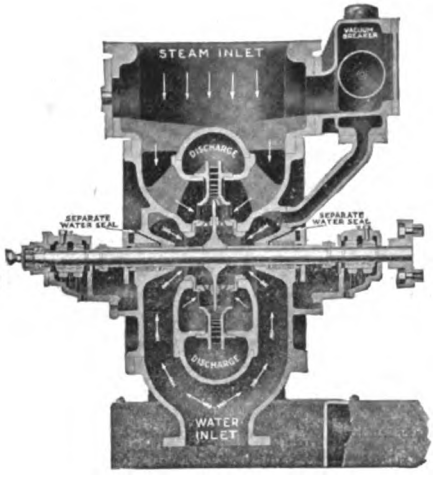
MANISTEE, MICH.

OFFICES IN ALL LARGE CITIES

Manufacturers of the Roturbo Rotary Jet Condensers and Air Pumps

MANISTEE ROTURBO ROTARY JET CONDENSER:

The Manistee Roturbo Rotary Jet Condenser is especially adapted to maintain high vacuums with a maximum efficiency. It is designed and built as well as good materials and fine workmanship will allow, always with the objective of durability foremost.



Advantages:

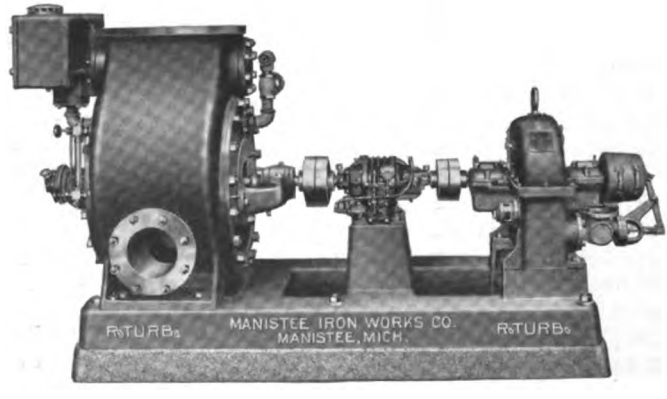
1. Simplicity—one moving part which performs the work of the circulating pump, condensing chamber and vacuum pump.



2. Capable of withstanding extremely variable loads with only a slightly changeable vacuum.
3. Perfect mixture and condensation.
4. Low power and high vacuum.
5. Space occupied a minimum.
6. Low initial cost and upkeep.

The Roturbo Condenser finds its greatest field in connection with high and low pressure turbines, steam engines and vacuum pans, but is also used in a large number of cooking processes. They are built for nearly every capacity and can be arranged for direct drive or through gears, belt or pulley.

The equipment is placed and serviced by capable representatives who await only the opportunity to be of assistance.



(See Part VII for additional products of this Company)

Digitized by Google

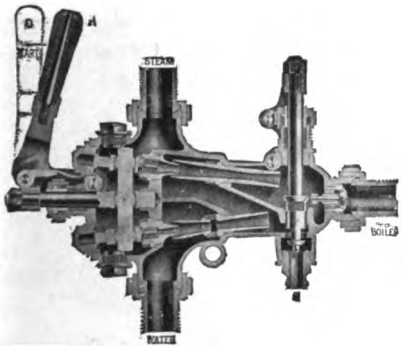
SCHUTTE & KOERTING CO.

1184 THOMPSON ST., PHILA., PA.

BRANCHES: NEW YORK, BOSTON, CHICAGO, PITTSBURGH, CLEVELAND, DENVER, KANSAS CITY CHARLOTTE, NEW ORLEANS, ST. LOUIS, DALLAS, ATLANTA, SAN FRANCISCO, SEATTLE, TULSA

JET DEPARTMENT:

Catalog 1—Injectors.
Catalog 2—Jet Apparatus for Lifting Liquid.
Catalog 3—Jet Apparatus for Heating Liquid.
Catalog 4—Jet Apparatus for Moving Air and Gases.
Catalog 6—Spray Nozzles.



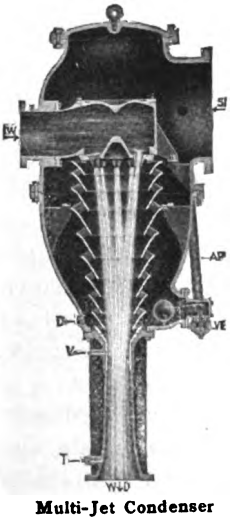
The **Koerting Universal Injector** needs no adjustment, takes water up to 150° F. discharges into boiler near boiling point.

CONDENSER DEPARTMENT:

Catalog 5.

The **Koerting Multi-Jet Condenser** is of low level type and built up to 5000 Kw. in single units.

Maintains a high Vacuum without air pump. No moving parts or stuffing box in Vacuum Chamber.

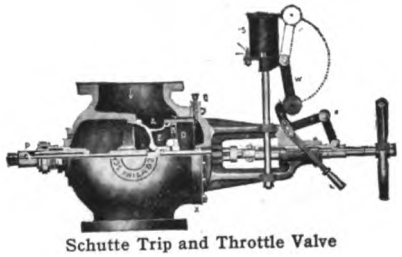


Multi-Jet Condenser

VALVE DEPARTMENT:

Catalog 8.

Stop Check (Non Return)
Emergency Stop Check
Engine Stop Check
Trip Throttle Balanced
Free Exhaust
Back Pressure
Butterfly
Gate
Hydraulic
Auld Reducing
Lead Valves



Schutte Trip and Throttle Valve

HEAT TRANSFER & OIL FIRING DEPARTMENT:



159

Catalog 10–12.

Catalog 6–0.

Oil Coolers
Oil Heaters
Evaporators
Distillers
Feed Water Heaters
Heating and Cooling of Air and Gases
Inter-Coolers
After-Coolers



The **S. & K. Oil Cooler** is used for cooling the Lubricating Oil of Steam Turbines and Bearings.

Digitized by Google

WESTINGHOUSE ELECTRIC & MFG. CO.

EAST PITTSBURGH, PA.

Atlanta, Ga.
Baltimore, Md.
Birmingham, Ala.
Bluefield, W. Va.
Boston, Mass.
Buffalo, N. Y.
Butte, Mont.
Charleston, W. Va.
Charlotte, N. C.
Chattanooga, Tenn.
Chicago, Ill.
Cincinnati, Ohio
Cleveland, Ohio
Columbus, Ohio
*Dallas, Tex.
Dayton, Ohio
Denver, Colo.
Des Moines, Ia.
Detroit, Mich.
Duluth, Minn.
Houston, Texas
*El Paso, Tex.
Indianapolis, Ind.
Joplin, Mo.
Kansas City, Mo.
Louisville, Ky.
Los Angeles, Cal.
Memphis, Tenn.
Milwaukee, Wis.
Minneapolis, Minn.
New Orleans, La.
New York, N. Y.
Philadelphia, Pa.
Pittsburgh, Pa.
Portland, Ore.
Rochester, N. Y.
St. Louis, Mo.
Salt Lake City, Utah
San Francisco, Cal.
Seattle, Wash.
Syracuse, N. Y.
Tucson, Ariz.
Toledo, Ohio
Washington, D. C.
Wilkes-Barre, Pa.
*W. E. & M. Co. of Texas

ELECTRICAL EQUIPMENT:

Generating Equipment
Switchboards
Switchboard Meters
Converters
Heating Devices
Lightning Arresters
Motors (Alternating Current)
Motors (Direct Current)
160 **Arc Lamps**
Control Equipment
Transformers
Regulators

Co-operative Service:

Westinghouse Electric & Manufacturing Company, manufacturers of apparatus for Generation, Application and Control of electric power, invite the members of the A. S. M. E. to use the facilities of our engineering department in the planning and selecting of electrical equipment.

Westinghouse Type SK direct-current motors are designed for general constant and adjustable speed service, and, therefore, find extensive application to machines used in practically every industry, especially for driving machine tools and for other services where the load is frequently started, stopped, or reversed. The SK motors are of steel construction, with few parts, all of which are readily accessible. The materials used have been selected so as to combine light weight with great mechanical strength.



Westinghouse Type CS alternating-current motors are designed for general constant speed service and are, therefore, applicable for driving machines in every industry. They are made in all standard sizes from 2 to 650 horsepower, for all commercial voltages and frequencies.



Forged open-hearth steel is largely used in the construction, which not only provides great strength but reduces the weight of the inactive material and all overall dimensions, to a minimum. The rotors are practically indestructible; the bearings have very liberal areas, are non-leaking and are protected from dust.

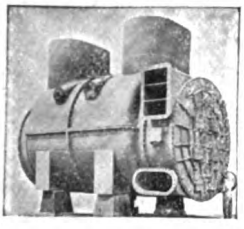
The efficiency, power factor, and overload capacity are unusually high, since high efficiency means low operating costs. Special attention has been given to this point, not only at full loads, but at fractional loads. As a result of these features, type CS motors can be depended upon to operate with maximum economy and to give satisfactory service for years, with little attention.

Digitized by Google

WESTINGHOUSE ELECTRIC & MFG. CO. E. PITTSBURGH

POWER EQUIPMENT:

Steam Turbine Generators from one to 100,000 horsepower
Condensers—Surface, Low-Level Jet and Barometric
Stokers—Underfeed, Roney and Chain Grate
Power House Auxiliaries, such as small geared turbine generators and geared turbines for Steam, Pump, Fan and Blower drive



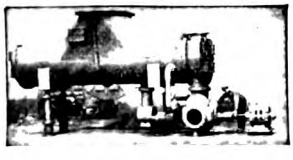
Large Surface Condensers

Because of their exceptional performance, Westinghouse Condensers have become generally known throughout this country and abroad as HIGH-VACUA Condensers.

They are installed and operating in many parts of the world—Peru, Russia, Brazil, Porto Rico, Manchuria, Cuba, New Foundland, Japan, Hawaii, New Mexico, British West Indies, Alaska, Siberia and other lands. Only Condensers of UNDISPUTED RELIABILITY could have become so widely known and used.

At the present time **Westinghouse Surface Condensers** are being built to serve turbines up to 100,000 horsepower.

COMPACTNESS is a very important feature of all Westinghouse Condensers. This is especially true of the Jet Type referred to later, and of the Unit Type



Unit Type Surface Condenser

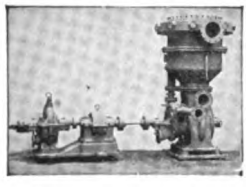
Surface. All pumps are located directly beneath and the pump runners are mounted on one shaft, driven by one turbine motor as demanded by local conditions.

Jet Condensers are also built in large sizes—the largest to date being a Twin to serve a 45,000 kw. turbine. The twin type is often made use of when large capacity is required, not because the limit in size of the single condenser is reached, but because the twin type frequently can be better adapted to the requirements of the installation. It has the additional advantage of greater surety of uninterrupted operation, for should it become necessary the full load of the turbine may be carried on one "leg" with good vacua until the necessary inspection of the other half is completed. This is a feature which should not be overlooked by the prospective condenser purchaser.



Twin Type Jet Condenser

The Westinghouse Leblanc Air Pump, used on all our Condensers, has become well known throughout the country on account of its very high efficiency. Being of the centrifugal type and removing the air by "water pistons" or water layers, it has the peculiar advantage of increasing in efficiency *at the time* highest efficiency



Small Low Level Jet Condenser

is most needed—as the VACUUM INCREASES. Hence the efficiency of the Leblanc Pump rises until maximum air scavenging is attained. The absence of reciprocating parts, valves and clearances, enables it to far exceed the reciprocating pump in efficiency and continuity of service.

Westinghouse Condensers are unexcelled in the ability to maintain high vacua, simplicity of construction, reliability and compactness.

Digitized by Google

WHEELER CONDENSER & ENGINEERING COMPANY

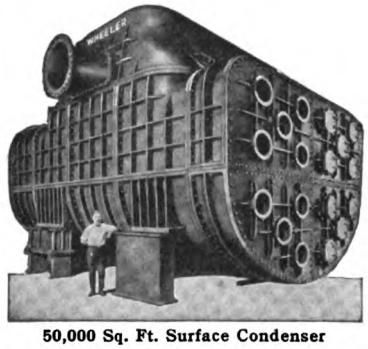
GENERAL OFFICE AND WORKS; CARTERET, N. J.

BRANCHES

NEW YORK	BOSTON	PHILADELPHIA	CHICAGO	NEW ORLEANS
PITTSBURGH	CLEVELAND	ST. LOUIS	SALT LAKE CITY	TUCSON
ATLANTA	SEATTLE	LOS ANGELES	CINCINNATI	LONDON
DENVER	CHARLOTTE	SAN FRANCISCO	BIRMINGHAM	SHANGHAI

Manufacturers of High Vacuum Surface, Barometric and Jet Condensers; Vacuum Pumps; Centrifugal Pumps; Evaporators; Cooling Towers; Feed Water Heaters; Brass and Copper Seamless Tubes and Pipe

HIGH VACUUM SURFACE CONDENSERS:



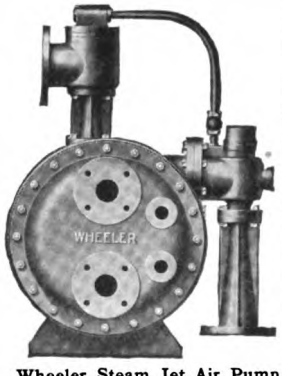
50,000 Sq. Ft. Surface Condenser

162

For turbines of any capacity. The compartment type can be cleaned while in service without shutting down the turbine. The auxiliary tube-plate type eliminates trouble from leakage of circulating water into the condensing chamber.

WHEELER JET CONDENSERS:

Of spray-distribution type for turbines of any size to maintain vacua of 28 to 29 in.



Wheeler Steam Jet Air Pump Patented

STEAM JET AIR PUMP:

Has exclusive patented features of two jets working in series with a condenser between the jets, which enables it to produce higher vacuum with much lower steam consumption than any other type ejector pump made.

WHEELER-EDWARDS AIR PUMP:

Eliminates expense of independent air and hot well pumps. No suction or bucket valves. Single, twin or triplex types; any drive.

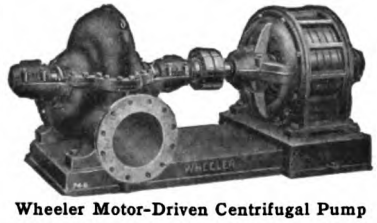
ROTATIVE DRY VACUUM PUMPS:

For high vacuum condenser work; maintains a vacuum within 0.5 in. of barometer.

TURBO-AIR PUMPS:

High speed rotary type for jet or surface condensers: directly connected to turbine or motor Highly efficient and reliable.

CENTRIFUGAL PUMPS:



Wheeler Motor-Driven Centrifugal Pump

High efficiency double-suction pumps for every service; circulating, hot well and tail pumps for condensers a specialty. Built in single stage horizontal and vertical shaft, and multi-rotor types; in all sizes; for any drive; lead, iron and bronze fitted to suit conditions.

CRESCENT BRAND SEAMLESS DRAWN TUBES AND PIPE:

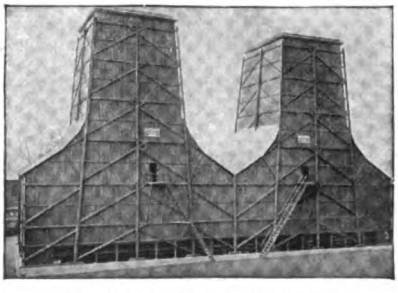


Made to specifications, of copper, brass, Muntz, Admiralty, and other non-ferrous alloys; tinned inside or outside or both; all standard sizes and gauges; cut to required lengths; pipe sizes threaded when so ordered.

LILLIE VAPOR-REVERSING EVAPORATORS:

Have special features of mechanical circulation, film evaporation and vapor reversibility. Built in single and multiple effects.

COOLING TOWERS:



Wheeler Wooden Cooling Tower

Cool the water to lowest temperature possible under prevailing conditions, and require less power input per gallon of water cooled than any other tower made; standardized unit construction permits additions to meet increased needs. Built in all sizes and capacities; of wood or steel; in every draft combination

Digitized by Google

C. H. WHEELER MANUFACTURING COMPANY

MAIN OFFICE AND WORKS:
SEDGLEY AND LEHIGH AVENUES, PHILADELPHIA, PA.

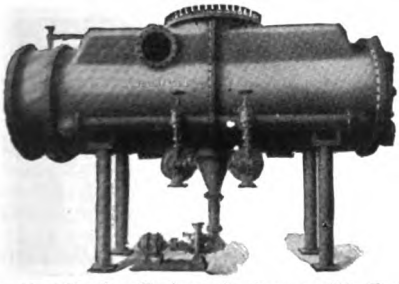
BRANCH OFFICES:

NEW YORK	BOSTON	CHICAGO	PITTSBURGH
SAN FRANCISCO	CLEVELAND	NEW ORLEANS	CHARLOTTE

Manufacturers of Surface Condensers, Jet Condensers, Vacuum Pumps, Centrifugal Pumps, Engines, Cooling Towers, Exhaust Gate Valves, Expansion Joints, Multiflex Atmospheric Relief Valves

C. H. WHEELER HIGH EFFICIENCY SYSTEM of Steam Condensers and Auxiliaries, in which we specialize, consists of:

HIGH VACUUM SURFACE CONDENSERS:

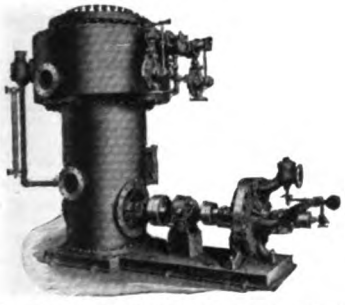


C. H. Wheeler Surface Condenser with Two Radojets and Motor Driven Hot Well Pump

C. H. Wheeler Condensers are built in all sizes and are liberally proportioned to insure steady high vacuum at minimum operating cost.

HIGH VACUUM JET CONDENSERS:

Specially designed, insuring complete and intimate mixture of water and exhaust steam.



C. H. Wheeler Jet Condenser with Two Radojets and Turbine Driven Removal Pumps through Reduction Gears

VACUUM PUMPS:

RADOJET, ejector type.

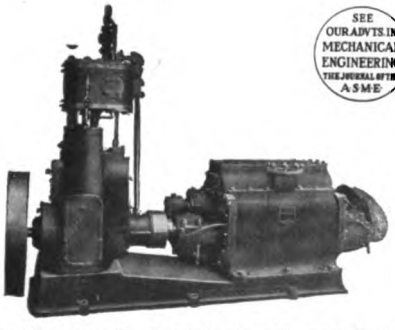


Radojet Vacuum Pump

Radojet Air Pumps are of the Ejector Type for removing air and non-condensable vapors and have the following points of advantage:

Lowest Steam Consumption
Minimum Space Requirement
Noiseless Operation
Continuous Service
No Moving Parts
Require no Lubrication

SEE OUR ADVTS. IN MECHANICAL ENGINEERING THE JOURNAL OF THE A.S.M.E.



Pratt Rotrex Suction Valveless Vacuum Pump, Engine Driven

Digitized by Google

E. B. BADGER & SONS COMPANY

75 PITTS ST. BOSTON, MASS.
101 PARK AVENUE NEW YORK, N. Y.

Manufacturers of Badger Equalizing Expansion Joints for High and Low Pressure

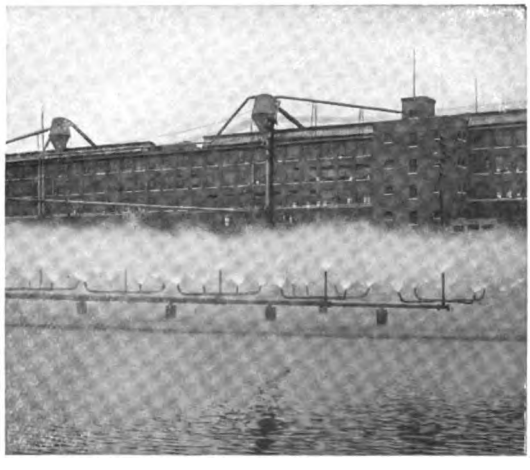
SPRAY DEPARTMENT PRODUCTS:

Water Cooling Systems; Air Washers; Air Conditioning Apparatus; Air Coolers; Smoke Washers; Odor Condensers; Gas Scrubbers; Humidifiers; Spray, Sewage and Aerating Nozzle; Spray equipment for acid plants.

USES FOR SPRAYING EQUIPMENT:

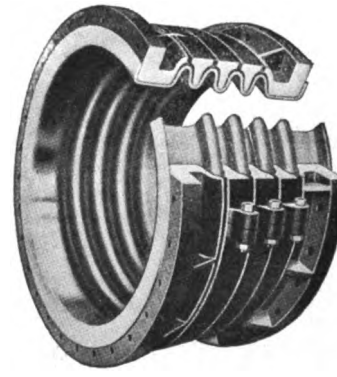
Cooling water for condensers, stills, etc., to afford 28″ vacuum or better.
Cooling liquids and spraying brine for refrigerating plants.
Cooling, spraying and washing oils.
Spray system for sulphuric acid plants.
Evaporating or densifying liquids by spraying at moderate temperature, resulting in fuel economy.
Spray plants for atomizing purposes.
Spray washers for scrubbing gases.
Dust precipitation and collection.
Aerating and purifying water supplies.
Condensing and absorbing odors and vapors.
Washing and humidifying air.
Cleaning blast furnace gases.
Reclaiming gasoline, etc.
Removing suds from paper machines.
Spraying (h u m i d i f y i n g) cements and fire clays.

SEE OUR ADVTS. IN MECHANICAL ENGINEERING THE JOURNAL OF THE A.S.M.E.



A Badger Cooling Pond

BADGER SELF-EQUALIZING EXPANSION JOINTS:



Are one-piece Joints made from Seamless Copper Tube, with deep corrugations properly designed to stand the repeated changes in shape due to temperature changes in pipe line.

The expansion is controlled in the Joints by Equalizing Rings fitted to the corrugations, which equally distribute the expansion over each corrugation, thus eliminating the possibility of fracture in the copper, due to having one corrugation take up all of the traverse.

Once they are installed with the necessary anchors and guides, they require no further attention as they are one-piece Joints and never require packing.

They are made for high and low pressure, each Joint being subjected to a hydraulic test before shipment.

Badger Self-equalizing Expansion Joints installed in your pipe lines will eliminate all future expansion troubles, and give you the maximum service at the least cost.

BADGER EQUALIZING EXPANSION JOINTS are made:

two corrugations to care for 1″ expansion

four corrugations to care for 2″ expansion.

We are also manufacturers of the Badger Single-corrugation Expansion Joint for connection between turbines and condensers, and designed for any special requirements.

Digitized by Google

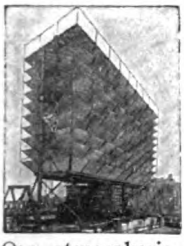
THE COOLING TOWER CO., INC.

15 JOHN ST., NEW YORK CITY

Engineers and Manufacturers of Water Cooling and Air Washing Devices

PRODUCTS:

Atmospheric, Chimney and Fan Cooling Towers; Spray Cooling Ponds and Equipment; Spray Nozzles; Air Washing and Cooling Apparatus.

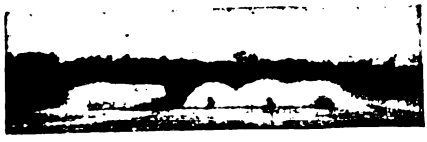


COOLING TOWERS:

Are ideal for saving and recooling the circulating water for condensers in connection with refrigeration, ice making and for all purposes where the lowest possible temperature of the gas or condensate is essential. Our atmospheric towers are sold in all sizes from 8 gallons per minute upwards. Above 200 gallons per minute they are designed on the multiple unit system allowing for extension as the plant grows without affecting either their efficiency or appearance. Extension parts kept in stock. Towers built entirely of wood or with wood cooling surfaces and louvres on a structural steel frame. Our formula guarantee of cooling gives Purchaser a check on performance under all conditions of temperature and humidity.

SPRAY COOLING SYSTEMS:

Except for small capacities or where a special basin is required, spray ponds cost less to install than a cooling tower of the same capacity, but more water is required on short ranges to produce the same final temperature. Spray cooling is most effective for steam condensing, jacket water and other high temperature work. We guarantee results by formula.



Impact Spray System, 10500 Gallons per Minute

The patented IMPACT NOZZLE is the simplest and most effective yet devised. Cast from bronze in one piece it is entirely devoid of turbine centers, spiral passages or other obstructions in the water passage. The spray being produced by the impact of two jets OUTSIDE the nozzle proper, an atomization of the water particles is obtained which is unequalled in any other type of nozzle. The spray cloud thus formed being flat and fan shaped, presents a larger surface to the surrounding air than is possible with a centrifugal nozzle discharging either a hollow or a solid cone of mist. The absence of all interior passages in the IMPACT NOZZLE renders it immune from plugging. These nozzles are made in all pipe sizes and various capacities and are specified for a variety of uses.

AIR WASHERS:

For washing and cooling the air supplied for ventilating turbo-generators, and for scrubbing the air in chemical plants, mills or wherever cool, clean air is required. The nozzles are so arranged in pairs that their intersecting sprays produce a very fine atomization of the water particles. This arrangement does away with the necessity for screens. Being comparatively few in number with large orifices, the nozzles run for a long period without cleaning. The following are predominating features of our washer:



1—Highly efficient dust removal and thorough elimination of free moisture from the washed air.

2—Freedom from interruption due to accumulation of dirt in the system.

3—Renewal of circulating water and automatic cleaning of the water box without interruption of the washing.

4—Absence of all fragile parts.

Like all our apparatus, these washers are designed and constructed with a view to repeat orders rather than orders for renewal. We rebuild worn-out washers in whole or in part.

Complete description of apparatus in Catalog 9B, sent on request.

SERVICE:

Our Engineering Department is capable and ready to aid in the solution of your problems.

SEE OUR ADVT. IN MECHANICAL ENGINEERING

Digitized by Google

SPRAY ENGINEERING CO.

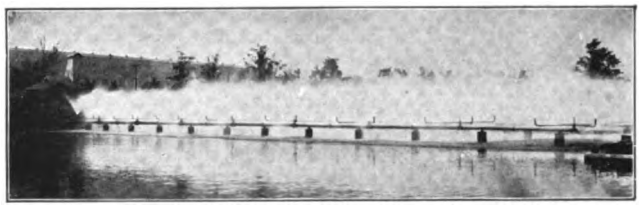
60 HIGH ST., BOSTON, MASS.

Engineers for Spray Cooling Systems, Air Conditioning, Gas Washing, Aerating Reservoirs, Irrigation Systems

Manufacturers of Air Washing Equipment, Spray Cooling Equipment, Flow Meters, Paint Spraying Equipment, Cement Spraying Equipment, Park Sprinklers, Nozzles for all Purposes

SPRACO COOLING SYSTEMS:

The SPRACO Cooling System is the simplest, most economical, and efficient device in existence for cooling water used in condensers, water jackets, transformers,



evaporators, and other equipment where the conservation of the water supply is essential.

166 Under ordinary conditions, the power required averages less than 1½% of the total power generated by the prime movers in the plant. A cooling tower of equal capacity would require for its operation about 3% of the total power generated.

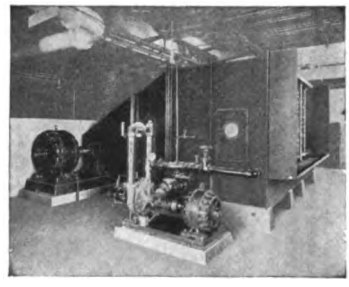
As SPRACO Cooling Systems have a lower initial cost, require less power for operation, and practically no maintenance as compared with well designed and constructed cooling towers, they are being used universally in connection with power plants, sugar centrals, etc.

We find from our experience in designing approximately one thousand ponds, now in successful operation in the United States and eighteen foreign countries, that it is impossible to lay down exact rules for the design of these ponds, as local conditions make each case a special problem. Hence, if the amount of water to be cooled, the amount of steam condensed in heating this water, the cooling or vacuum desired, as well as the dimensions of the space available for the installation and whether on ground or roof are given us, we shall be pleased to send complete specifications and sketch of arrangement best suited to conditions given.

The Spray Engineering Company accepts full responsibility for the design of every SPRACO System and guarantees the cooling in every case.

SPRACO AIR WASHERS:

As the capacity of an electric generator is directly dependent upon its temperature, which in turn depends upon the air conditions, an ample supply of cool, clean air is of great importance. Unless a generator is kept clean, by supplying it with washed air, its load-carrying capacity will be decreased. Dust or soot deposited within the machine greatly reduces the efficiency of air as a cooling medium. Unwashed air, therefore, means excessive heating, which not only reduces the electrical efficiency, but shortens the life of insulation so that grounds and even burnouts are liable to occur.



Generators equipped with SPRACO Air Washing and Cooling equipments are free from these troubles. They can be furnished either of the ordinary non-recirculating air type or for the new enclosed system of ventilation. The resulting gain in efficiency and capacity, the saving in maintenance, and longer life of the machines to which they are attached, make the installation of SPRACO washers inevitable in all progressive and up-to-date power plants.

SEE OUR ADVTS. IN MECHANICAL ENGINEERING THE JOURNAL OF THE A.S.M.E.

Digitized by Google

SPRAY ENGINEERING CO. BOSTON, MASS.

SPRACO PNEUMATIC PAINTING EQUIPMENT:



The modern method of applying paints and other protective coatings is by the use of compressed air. This is rapidly superseding the old hand-brushing method not only by reason of the great saving in time and labor, but also due to the fact that better results are obtained. The improved SPRACO Pneumatic Painting Equipments meet the demand for an efficient, rugged device, suitable for a wide range of work. The portable outfits are compact and well adapted for all stationary work such as building interiors and exteriors, structural work, ships, tanks, etc. Smaller equipments are designed to meet every requirement of the interior decorator as well as for industrial finishing room work such as automobiles, furniture and miscellaneous manufactured commodities. Each outfit is complete in itself, ready for attachment by hose connection to your compressed air supply.

In addition to the painting outfits, a full line of accessories such as exhaust hoods, portable and stationary air compressors, etc., are carried.

SOME OF THE ADVANTAGES:

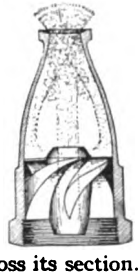
One workman can do the work of three to twelve painters using brushes, depending upon the nature of the work. Uniformly finished coatings, free from streaks and brush marks, are produced. Rough, irregular, and inaccessible surfaces are readily coated. Either a lighter or heavier coating can be obtained than is possible with hand-brushes. Standard guns are capable of handling all classes of liquid coatings and may be mounted on an extension pole for painting surfaces beyond the reach of the operator. The gun and control head may be blown free from paint or cleaned without taking apart.



VAUGHAN FLOW METER:

The Vaughan Flow Meter, as illustrated, is an instrument designed to meet the demand for a simple and efficient method of accurately indicating the flow of liquids in pipes under pressure. It is especially applicable for indicating the flow of water to electric transformers, boiler supply, bearing lubrication for turbines, as well as miscellaneous commercial purposes where the capacity of the liquid does not exceed 100 G.P.M.

SPRACO CENTER JET NOZZLES:



The patented SPRACO nozzlesare simple in design yet produce a spray entirely different from that of any other type of nozzle. A part of the liquid is given a rapid rotating motion by the turbine center, and is driven forth through the orifice by the central driving jet, producing a spray of solid conical formation of equal density across its section. This feature makes it the most efficient nozzle on the market, and especially advantageous in cases where it is desired to bring a finely divided liquid into intimate contact with air or other gases. SPRACO nozzles are used for:

- Aerating Water Supplies
- Atomizing Liquids
- Brine Spraying for Refrigeration Purposes
- Evaporating Liquids
- Humidifying Air
- Reclaiming Gasoline
- Scrubbing Gases
- Special Chemical Purposes
- Spraying Bituminous Materials in Road Construction, etc.
- Fire Prevention for Log Piles, etc.

SERVICE:

Our customers are at liberty to refer their problems to our Engineering Department for advice as to proper installation, operation, etc.

MEMBER NATIONAL ASSOCIATION OF MANUFACTURERS

Digitized by Google

BUCKEYE IRON & BRASS WORKS

DAYTON, OHIO, U. S. A.

Manufacturers of Valves in Iron, Brass, and Steel; Blow-off, Check, Gate, Regrinding, Relief, Safety, Standard, Throttle, and Hydraulic Valves:—Whistles, Brass Cocks, Water Gauges, Oil Cups, Fusible Plugs

STANDARD BRASS VALVES:

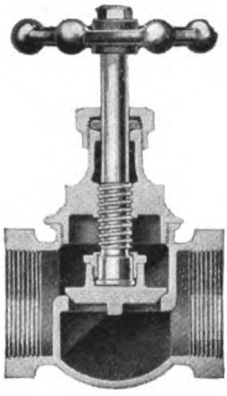


Fig. 32
Standard Brass Globe Valve

Buckeye Standard Brass Globe, Angle and Cross Valves. Standard suitable for 125 pounds Extra Heavy for 250 pounds working pressure. Regular sizes ⅛″ to 3″, screwed or flanged or with union when ordered. Packs under pressure.

Write for Bulletin A-1

REGRINDING BRASS VALVES:

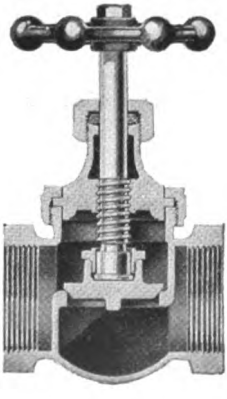


Fig. 34
Regrinding Brass Globe Valve

Buckeye Regrinding Brass Globe, Angle and Cross Valves. Standard suitable for 125 pounds, Extra Heavy for 250 pounds working pressure. Regular sizes ⅛″ to 3″, screwed or flanged or with union when ordered. Seating surface can be reground. Packs under pressure.

Write for Bulletin A-2

WATER RELIEF VALVE:



Fig. 230
Water Relief Valve

Buckeye Water Relief Valve. Built principally to be used on house watering systems, adjustable for working pressures up to 75 pounds. Regular sizes ⅜″ to 1″. Adjusting nuts carefully protected. Furnishes absolute protection to the water system.

Write for Bulletin A-6

IRON BODY VALVES:



Fig. 4
Iron Body Yoke Type Globe Valve

Buckeye Iron Body Valves. Standard suitable for 125 pounds, Extra Heavy for 250 pounds working pressure. All sizes, screwed, flanged or beaded. Made to pack under pressure when ordered. Special valves made to order from specifications.

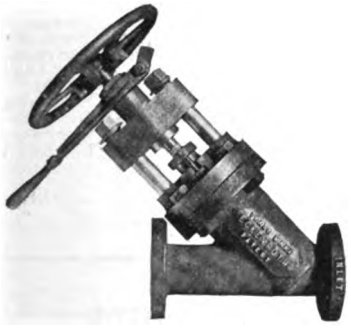
Write for Bulletin A-12

Digitized by Google

ECKENROTH VALVE & MANUFACTURING CO.

156–158 CONARROE STREET, MANAYUNK, PHILA., PA.
PHILADELPHIA NEW YORK CHICAGO

Manufacturers of Automatic Reseating Valves



ECKENROTH AUTOMATIC RESEATING VALVES are a distinct improvement in valve construction.

We have established the fact, after a number of years of intensive study of valve problems in general, that the cause of valves becoming inefficient lies in their bonnet structure rather than in their bodies.

The rotating disc feature, exclusively ECKENROTH, permits of positive control of seating surfaces at all times. By this means any encrustation that may take place or any substance that may adhere to the seating surfaces can be easily and quickly removed and the surfaces can be kept in a highly polished state.

The slight wear around the seating surfaces resulting from the rotation of the disc on the seat during closing, offsets or compensates for the natural wear across them. This compensating wear is absolutely necessary to prevent leakage.

The fact that regrinding, renewal and reversal of seats is resorted to is conclusive evidence that their surfaces do not wear true, and in order to avoid these frequent regrindings, etc. a valve should possess some feature in its structure that assures an equal wear over the entire seating surfaces.

The rotating disc feature embodied in the Eckenroth bonnet structure, is the means that assures this equal wear.

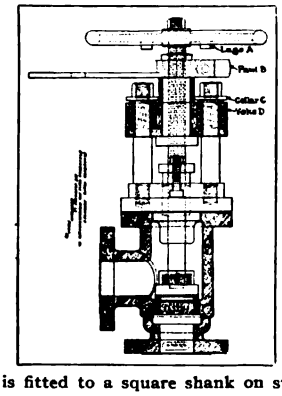
Eckenroth valves are especially built for extremely hard service such as boiler blow-off, superheat steam, alkali, acid and oil.

It is our aim to give the valve user 100% efficient service and unless we can guarantee this service we would rather not accept an order.

EXTRA HEAVY IRON OR STEEL BLOW-OFF VALVES.

Angle and Straightway Types, Flanged or Screwed.

Note floating yoke containing springs which furnish a resilient means of rotating disc on seat after their surfaces come in contact

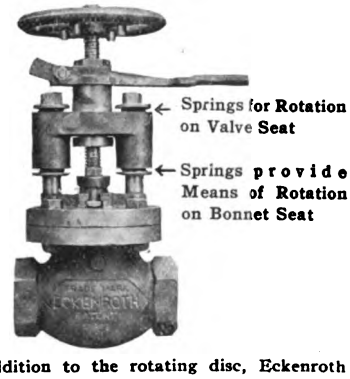


Disc is fitted to a square shank on stem and revolves with it. As the seating surfaces come in contact, compression of springs begins and disc will rotate on seat until springs are entirely compressed.

The lever has two functions. It is used as a locking device for final seating after valve has been closed with hand wheel and may also be used for continuous rotation by engaging it with hand wheel. The latter however is seldom if ever necessary.

EXTRA HEAVY IRON AND STEEL GLOBE VALVES.

Flanged or Screwed.
Special Packing Under Pressure Feature.



In addition to the rotating disc, Eckenroth globe valves are so constructed that they can be packed under pressure with absolute safety. Just as the disc rotates on the seat in closing, so does the disc nut rotate on the specially provided bonnet seat in opening. Resiliency for this rotation is furnished through springs located in the under side of floating yoke.

These valves are built to meet the requirements of any service.

Digitized by Google

CRANE CO.

Founded by R. T. Crane 1855

836 So. MICHIGAN AVE., CHICAGO, ILL.

SALES OFFICES, WAREHOUSES AND SHOWROOMS:

BOSTON	READING	KNOXVILLE	CINCINNATI	ST. PAUL	SEATTLE
SPRINGFIELD	NEWARK	BIRMINGHAM	INDIANAPOLIS	WINONA	TACOMA
BRIDGEPORT	ATLANTIC CITY	MEMPHIS	DETROIT	MINNEAPOLIS	PORTLAND
HARTFORD	CAMDEN	LITTLE ROCK	CHICAGO	DULUTH	POCATELLO
ROCHESTER	BALTIMORE	MUSKOGEE	ROCKFORD	FARGO	SALT LAKE CITY
ALBANY	WASHINGTON	TULSA	OSHKOSH	WATERTOWN	OGDEN
NEW YORK	SYRACUSE	OKLAHOMA CITY	GRAND RAPIDS	ABERDEEN	SACRAMENTO
HARLEM	BUFFALO	WICHITA	DAVENPORT	GREAT FALLS	OAKLAND
BROOKLYN	SAVANNAH	ST. LOUIS	DES MOINES	BILLINGS	SAN FRANCISCO
PHILADELPHIA	ATLANTA	KANSAS CITY	OMAHA	SPOKANE	LOS ANGELES
		TERRE HAUTE	SIOUX CITY		

WORKS: CHICAGO AND BRIDGEPORT

CRANE LIMITED — MONTREAL, TORONTO, VANCOUVER, WINNIPEG, REGINA, HALIFAX, OTTAWA, CALGARY

We Manufacture

a Complete Line of

VALVES, COCKS AND FITTINGS

in

Brass

Iron

Ferrosteel

Cast Steel

for all pressures and purposes.

Malleable and Cast Iron

Screwed Fittings

Drainage Fittings

HYDRAULIC VALVES AND FITTINGS:

Twenty thousand articles for use in handling steam, water, gas, air, oil, etc.

FLANGED FITTINGS

of every description.

Pipe Fitters' Tools

and

Engineers' Supplies

STEAM SPECIALTIES:

Automatic Stop-Check Valves, Emergency Engine Stop Valves, Exhaust Relief and Back Pressure Valves, Steam and Oil Separators, Steam Traps, Pop Safety and Relief Valves.

Cast Steel Valves and Cast Steel Fittings especially constructed for Superheated Steam.

Estimates furnished from drawings submitted, on Complete Piping Equipment, Pipe Bends, etc.

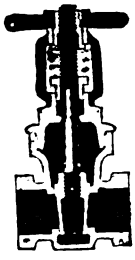
Digitized by Google

CRANE VALVES
that comply with the
A. S. M. E. BOILER CODE:

Crane Outside Spring and Yoke Pop Safety Valves are high capacity, high lift valves complying with all stationary Boiler Rules, as well as the A. S. M. E. Boiler Code.



No. 1117 Flanged, Pop Safety Valve



No. 68E Brass Gate Valve

When Outside Screw and Yoke Gate Valves are used there is never any doubt of the valve being open or closed. The stem is the positive indicator. The No. 68E Valve shown is an ideal water column connection valve.



No. 30E Automatic Stop Check Valve

Stop Check Valves are primarily safety devices and dependability is of first importance. The simplicity of this valve should appeal to the engineer.



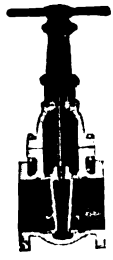
No. 92E Brass Boiler Feed Check

The No. 92E is a Dash-Pot Check Valve designed for hard service. It can be easily reground when necessary.

The special construction of cast iron disc adds materially to the wearing quality of this high grade Blow-Off Valve.



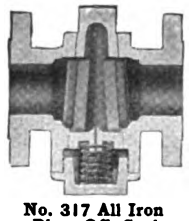
No. 391 Flange Blow-Off Valve



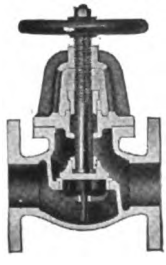
No. 9E Gate Valve

Crane Wedge Gate Valves are well proportioned and have properly fitted discs, assuring satisfactory service.

Extra Heavy All-Iron Blow-Off Cocks are made with compensation spring which is located between the plug and the cap and automatically takes up wear and holds the plug securely in place at all times.



No. 317 All Iron Blow-Off Cock



No. 87E Brass Boiler Feed Stop Valve

For boiler feed service where reliability is of importance, this Bolted Bonnet Outside Screw and Yoke Brass Valve will give satisfaction.

SEE OUR ADVTS. IN MECHANICAL ENGINEERING THE JOURNAL OF THE A.S.M.E.

BOILERS EQUIPPED WITH THESE VALVES REPRESENT THE BEST ENGINEERING PRACTICE.

(Continued on next pages)

Digitized by Google

(Continued from preceding pages)

CRANE CO. **CHICAGO, ILL.**

CRANE CAST STEEL VALVES AND FITTINGS:

We have been manufacturing for some time steel valves and fittings to meet a steadily growing demand for a superior grade of goods, especially adapted for High Pressure, Saturated and Superheated Steam Lines and Extreme Hydraulic Service. One line is suitable for 250 pounds pressure and 700 degrees F. and a special line is suitable for 400 pounds pressure and 800 degrees F. We are prepared to supply Pop Safety, Gate, Blow-Off Valves, and all other material to comply with the A. S. M. E. Boiler Code.



No. 9A
Rising Stem Gate Valve with By-Pass



No. 23A
Angle Valve

GENERAL SPECIFICATIONS FOR STEEL VALVES:

CAST STEEL Body, Bonnet, Disc and Yoke
MONEL METAL Seats
ROLLED MONEL METAL Stems



No. 101 D Elbow

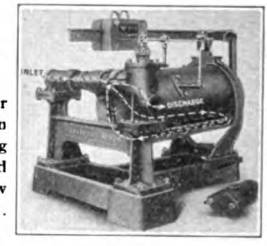


No. 105 D Tee

Extra Heavy Cast Steel Flanged Fittings

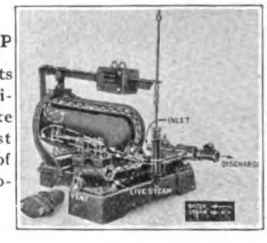
NON-RETURN TRAP

This is the proper trap to use when large discharging capacities and unrestricted flow are essential.



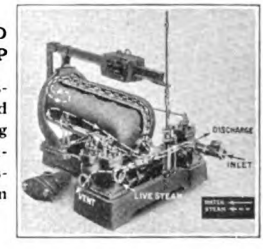
DIRECT RETURN TRAP

All working parts are readily accessible, helping to make this trap the most desirable form of boiler feeding apparatus.



LIFTING AND VACUUM TRAP

This trap is especially designed for eliminating condensation under varying pressure and vacuum conditions.





COMBINATION BACK PRESSURE AND EXHAUST RELIEF VALVE

For condensing or non-condensing engines.

The lever and weights of these valves are so arranged that valves can be used as atmospheric exhaust relief valves for condensing engines, or as back pressure valves for non-condensing engines.

Digitized by Google

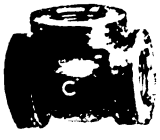


Cylinder Operated Valve

Cylinder Operation provides a highly satisfactory method for the quick operation for gate valves.

CRANE FORGED STEEL VALVES AND FITTINGS:

For high pressure and high temperature work, small size Forged Steel Valves and Fittings are most satisfactory.

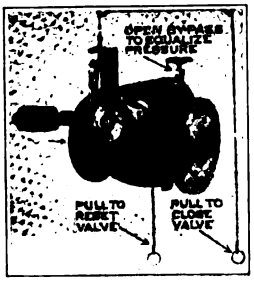






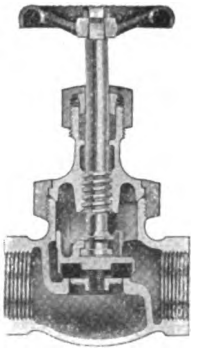
EMERGENCY ENGINE STOP VALVE:

The frequency of accidents which require the shutting off of steam instantly has led several states to require by law a quick-closing Engine Stop Valve on the steam lead to each engine.



BRASS GLOBE AND ANGLE VALVES:

The No. 7 Valves are made with union bonnets and Jenkins disc for steam pressures up to 150 pounds. Designed to be used in plants where continuous service is required and where discs must be changed quickly without injury to the valve.



No. 7 Brass Globe Valve

STEAM SEPARATORS:

Crane Steam Separators have large areas and ample baffle surfaces, affording the highest degree of efficiency with the slightest loss in pressure.



No. 013 Extra Heavy Vertical Separator

BRASS RELIEF VALVES:

The No. 1128 Brass Relief Valve is recommended for boiler feed service.



No. 1128 Brass Relief Valve

Digitized by Google

THE FAIRBANKS COMPANY

416 BROOME ST., NEW YORK, N. Y.

Manufacturer of Iron Body Gate Valves and Check Valves, Sphero Valves, Bronze Valves, Bronze Check Valves, etc.

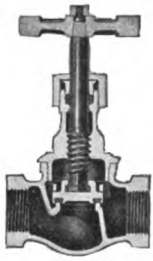


Fig. 01
Bronze Globe

FAIRBANKS BRONZE VALVES:

Fairbanks Bronze Globe, Angle and Cross Valves, with Renewable Vulcabeston Ring Discs, suitable for Steam Working Pressure up to 150 pounds. Regularly made in sizes ⅛ to 3 inches Screwed and ½ to 3 inches Flanged.



Showing the ease of renewability. Slip old disc from end of spindle and substitute a new one.



Fig. 0201
Bronze Gate
Renewable

Fairbanks Bronze Gate, Renewable Bronze Seat Rings, for Steam Working Pressures up to 150 pounds. Made both inside screw and outside screw and yoke. Screwed and Flanged. Sizes ½ to 3 inches.



Fig. 0208
Bronze Gate
Extra Heavy Pattern

Fairbanks Bronze Gate Valves, Extra Heavy Pattern, dependable for Power Plant service. Suitable for Steam Working Pressures up to 250 pounds. Made in Screw Ends sizes ¼ to 2 inches. Larger sizes made from Iron Patterns.



Fig. 0601
Bronze Swing Check

Fairbanks Bronze Swing Check Valves, Straightway full pipe area. Rotating Disc can be reground. Can be used in Horizontal or Vertical pipe. Screw Ends, sizes ¼ to 3 inches suitable for Steam Working Pressures up to 150 pounds.



Fig 0608
Bronze Check
Regrinding

Fairbanks Bronze Check Valves, Regrinding. Made in Globe, Angle and Vertical Types in two weights, for pressures up to 200 pounds and 300 pounds. Sizes ¼ to 2 inches.

FAIRBANKS IRON BODY VALVES:

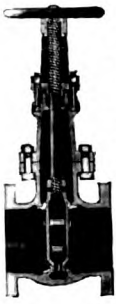


Fig. 0110
Iron Body Globe
Extra Heavy
Pattern

Fairbanks Iron Body Globe and Angle Valves, with Bronze Bevel Seats and Swivel Discs. Sizes to 3½ inch inclusive have solid Bronze Discs. Sizes 4 inch and larger have iron holder with bronze facing. Suitable for Steam Working Pressures up to 250 pounds. Made with Screw Ends 2 to 8 inches, Flange Ends 2 to 12 inches.

Digitized by Google

FAIRBANKS IRON BODY VALVES:



Fairbanks Iron Body Gate Valves, with Renewable Bronze Seat Rings, and Double Taper Solid Wedge with Bronze Faces. Made both inside screw and outside screw and yoke, either Screwed or Flanged in three weights, for Pressures up to 150, 200 and 250 pounds steam. Sizes 2 to 12 inches Screwed and 2 to 18 inches Flanged.





Fig. 0313

Fairbanks Iron Body Gate Valves with By-pass. Renewable Bronze Seat Rings. Flange Ends sizes 6 to 18 inches, suitable for Steam Working Pressures up to 200 and 250 pounds.

Fairbanks Iron Body Swing Check Valves, Straightway. Suitable for Steam Working Pressures up to 250 pounds and water



Fig. 0705



Working Pressures up to 350 pounds. Screwed in sizes 2 to 10 ins. and Flanged 2 to 12 inches.



Fairbanks Sphero Valves, suitable for Steam Working Pressures up to 200 pounds. Made with Screw Ends and Flange Ends, in sizes 1 to 3 inches. Also Flange Ends with Worm Gear attachment in sizes 4, 6 and 8 inches.

The best Blow-off valve made. Also recommended for use in Rubber, Soap and Galvanizing plants, for Marine, Stationary, or Locomotive service, and for Oils, Hydraulics and Acids.

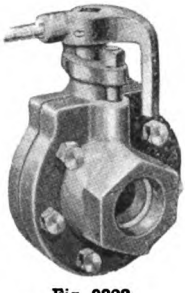
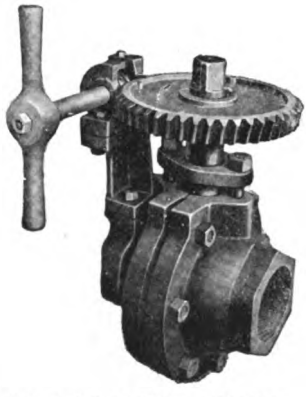


Fig. 0828
Sphero Valve



4 inch Sphero Valve with Worm Gear Attachment

The Bodies are fitted with the well known Vulcabeston Rings encased in Steel. The Worm Gear Type is particularly adapted for Digester work in Paper Mills.

Digitized by Google

FORD REGULATOR CORPN.

1836 LYTTON BLDG.,
CHICAGO, ILL.

402 BROOME ST.,
NEW YORK, N. Y.

Manufacturers of The "Ford" Steam and Water Valve Specialties

FORD NEW YORK

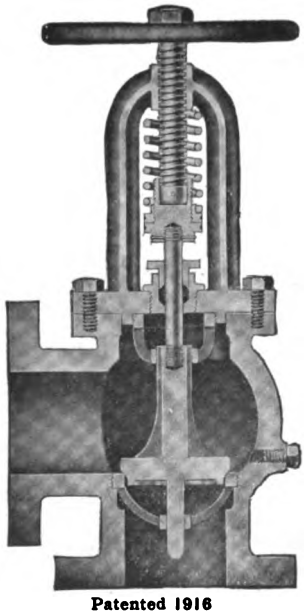
TRADE MARK

THE "FORD" AUTOMATIC STOP AND CHECK VALVE:

(Pat. 1916)

A genuine improvement in non-return valves, the construction positively removing the objections encountered in the earlier types, sticking and chattering.

176



Patented 1916

Sticking is caused by unequal expansion in the dash-pot. The "FORD" Valve has no dash-pot.

Chattering is caused usually by a dash-pot made of too free and loose a fit, in order to minimize sticking.

The "FORD" Valve employs an entirely different principle, which not only tries to avoid chattering, but which *does* avoid chattering.

As the "FORD" Valve is without dash-pot, we went about the prevention of chattering from a different angle. Most valves are balanced, causing an equilibrium at a certain opening of piston. The "FORD" Valve is unbalanced and therefore does not possess the tendency to chatter. Furthermore, we figured the value of an apron or piston choke-off "A," so that by the time steam is flowing from boiler into main in any appreciable quantity, the valve disc itself is far enough from its seat to make wire-drawing an impossibility.

It is adjustable for sensitiveness to checking, a feature contained in no other valve.

Superheated steam: "FORD" construction produces the ideal valve for superheat work. Contains *not a single snug fit* to stick under extreme temperatures.

Triple Duty Valves a trifle more intricate, of course, but a marvel of simplicity for the complex service involved.

SEE OUR ADVT. IN MECHANICAL ENGINEERING THE JOURNAL OF THE A.S.M.E.

Send for blue prints of

THE VALVES THAT CANNOT STICK

Pump Regulating Valves

High Pressure Tank Float Valves

Steam and Water Reducing Valves, Etc.

COMPLETE THE "FORD" LINE

CATALOG ON REQUEST



Pump Regulating Valve

Digitized by Google

HOMESTEAD VALVE MFG. CO.

P. O. BOX 1754, PITTSBURGH, PA.

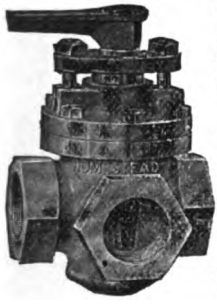
NEW YORK OFFICE: No. 242 Lafayette St., NEW YORK CITY

Manufacturers of Homestead Valves and Other Specialties

HOMESTEAD (Quarter Turn) PLUG VALVES:



The first illustration shows our Homestead Straightway Valve, with flanged connections. This pattern is used extensively as a boiler blow-off valve.



Homestead Valves are equally serviceable on all kinds of exacting or high pressure work.

The three-way and four-way valves as shown on the second and third illustrations are used as operating valves on air, water, steam and for many other purposes.



Homestead Valves are so constructed that they open and close with a quarter turn, operate easily and are free from leakage through the valve, the stuffing box or body.

HOVALCO (Blow-Off) VALVE:

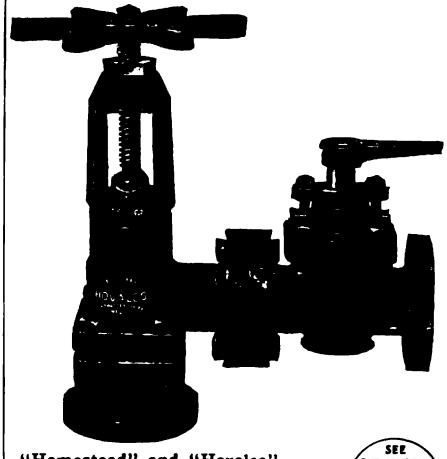
The valve here shown is a new pattern angle blow-off valve, semi-steel body, and special composition seat. The disc and seat are reversible, renewable and can be reground. Note the accessibility and the ease with which the parts of this valve can be renewed.

Figure below shows the "Homestead" and "Hovalco" valve combined. For boiler blow-off purposes, no better arrangement can be secured. The advantages of the double blow-off arrangement are many, the "Hovalco" Valve can be repaired or renewed at any time without closing down the boiler. This is done by closing the "Homestead Cock," while the repairs are being made. The best power plants being built are specifying this arrangement of blow-off valves.



"Hovalco" Valve

In accordance with the A. S. M. E. Boiler Code.



"Homestead" and "Hovalco" Valves Combined

Catalogue of our complete line sent upon request.

SEE OUR ADVTS. IN MECHANICAL ENGINEERING THE JOURNAL OF THE A.S.M.E.

Digitized by Google

JARECKI MANUFACTURING CO.

ERIE, PA.

Manufacturers of Cast Iron, Malleable and Brass Pipe Fittings; Brass and Iron Valves and Cocks, Etc., for Steam, Gas, Water, Air and Oil—Governors—Pipe Threading Tools—Oil Well Supplies

MALLEABLE, CAST IRON AND BRASS PIPE FITTINGS. Screwed and Flanged. Standard, Extra Heavy and Hydraulic.

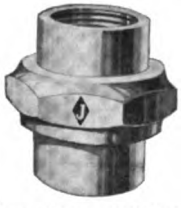


Malleable Fitting



Cast Iron Fitting

MALLEABLE LIP UNIONS, BRASS GROUND JOINT UNIONS, Standard, Extra Heavy and Hydraulic.



Brass Union, Polished



Brass Globe Valve

BRASS AND IRON VALVES AND COCKS, Standard, Medium, Extra Heavy and Hydraulic, Globe, Angle, Cross, Check, Gate and Regrinding.



"U Clamp" Gate Valve



Nickel (or Hard Bronze) Seat and Disc Valve



Iron Body Globe Valve

IRON BODY VALVES, Plain and Yoke Top, Brass Mounted, Brass and Steel Stem, Screwed and Flanged, Standard, Extra Heavy and Hydraulic.



Iron Body Engine Valve



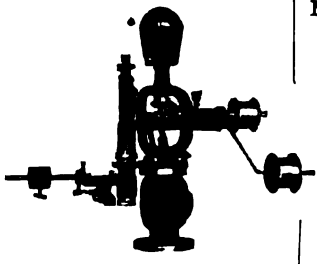
Iron Body Gate Valve

IRON AND BRASS FLANGE UNIONS, Expansion Joints.

Digitized by Google

JARECKI MANUFACTURING CO. ERIE, PA.

Air Compressor Governors — Vacuum Pump Governors — Pump Governors



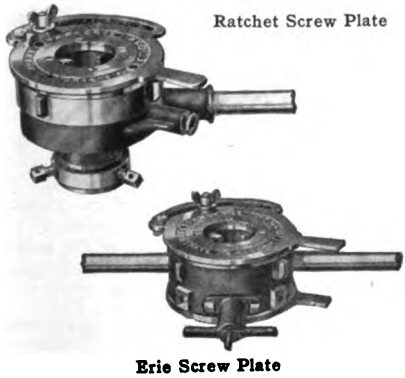
Erie Compressor Governor

Erie Compressor Unloader maintains practically a constant air pressure, completely unloads and loads compressor without shock or strain.



Erie Unloader for All Styles of Air Compressors

ERIE SCREW PLATE AND PIPE CUTTER:



Erie Screw Plate

Has adjustable self-centering dies and guides. Each set of dies threads four or more sizes of pipe. Plate can be detached from finished work without turning back on thread.

Ratchet Screw Plate for threading pipe in corners and ditches.

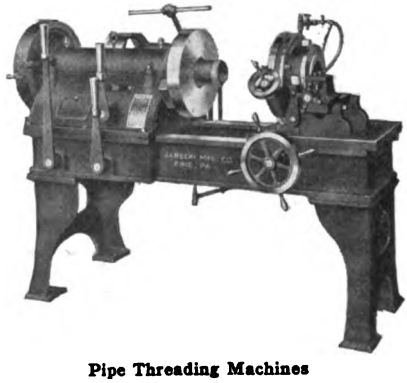
MALLEABLE PIPE VISE:



Pipe Vise

By means of the hinged beam which holds upper jaw pipe can be placed in vise at any point; made in four sizes to take pipe from 1/8″ to 12″.

JARECKI PIPE THREADING MACHINES:



Pipe Threading Machines

Hand, Belt, Steam Engine or Electric Motor Drive.

There are 21 different styles and sizes of these machines, each threading and cutting eight to twelve different sizes of pipe. The machine shown in our No. 44, which threads and cuts eight different sizes of pipe, from 1″ to 4″. Each size pipe should be threaded at a certain speed to get the best and most economical results. These eight speeds are instantly obtained by three vertical levers on operator's side of the machine.

Digitized by Google

JENKINS BROS.

80 WHITE ST., NEW YORK — 524 ATLANTIC AVE., BOSTON
133 NO. SEVENTH ST., PHILADELPHIA — 646 WASHINGTON BOULEVARD, CHICAGO
103 St. Remi St., MONTREAL — 6 Great Queen St., KINGSWAY, LONDON, W. C.
ADDITIONAL SALES OFFICES
WASHINGTON PITTSBURGH ST. LOUIS SAN FRANCISCO HAVANA

Manufacturers of Valves in Brass, Iron and Cast Steel; Sheet Packing, Gaskets, Discs, Pump Valves; other Mechanical Rubber Goods, and Compressed Asbestos Jointing

JENKINS BRASS VALVES:



Fig. 106 Brass Globe Valve Standard Pattern

Jenkins Brass Globe, Angle and Cross Valves, *Standard Pattern*, with Jenkins Renewable Discs, suitable for working steam pressures up to 150 pounds, or 250 pounds water. Regularly made in sizes ⅛ to 3 inches, screwed or flanged. Larger sizes in brass made from iron body patterns.



Fig. 114 Brass Hose Angle Valve

Jenkins Fire Line Globe and Angle Valves with Jenkins Discs of flexible rubber composition insuring tightness under cold water pressures up to 250 pounds. Sizes ½ to 3 inches, with or without cap and chain, in any style of finish required.

Jenkins Brass Horizontal Angle, and Vertical Check Valves correspond to same standard as the Stand ard Pattern Globe and Angle Valves. Regularly furnished with Jenkins Discs of semi-hard composition which will soften slightly under the action of hot water. When specified for cold water, air or gas, a soft, flexible rubber disc is supplied, suitable for 150 pounds working pressure. Sizes ⅛ to 3 inches, screwed or flanged.



Fig. 352 Brass Swing Check Valve Standard Pattern

Jenkins Brass Swing Check Valves are made with globe-shaped bodies. Adapted for either horizontal or vertical installation. Furnished with Jenkins Disc, suitable for 150 pounds pressure Sizes ¼ to 3 inches, screwed or flanged.



Fig. 124 Brass Y Valve Standard Pattern

Jenkins Brass "Y" Valves, besides their extensive use for blow-off service, are particularly desirable for handling muddy and gritty water, and thick, heavy fluids. Sizes ⅜ to 3 inches, screwed or flanged.



Fig. 370 Brass Gate Valve Standard Pattern

Jenkins Brass Gate Valves *Standard Pattern*, especially desirable for plumbing or other service under working pressures 125 pounds steam or 175 pounds water. Made both inside screw and outside screw and yoke. Regularly have rough body, finished trimmings; but polished, nickel plated, wood wheel, brass wheel, or other special finish furnished when so ordered. Sizes ¼ to 3 inches, screwed or flanged.

Jenkins Brass Gate Valves, *Medium Pressure*, are especially designed for steam, or hot and cold water lines where high grade installation is required but pressure carried does not warrant use of the more expensive extra heavy pattern. They are guaranteed for 175 pounds steam, 250 pounds water. Sizes ¼ to 3 inches.



Fig. 270 Brass Gate Valve Medium Pressure

JENKINS IRON BODY VALVES:



Fig. 142 Iron Body Globe Valve, Standard Pattern

Jenkins Iron Body Valves, *Standard Pattern*, are heavier and considerably stronger than the average iron body valves. Have Jenkins Discs and renewable seat rings. Suitable for working pressures 150 pounds steam or 250 pounds water. Globe and angle valves; sizes 2 to 24 inches inclusive; cross valves up to 8 inches; horizontal and angle vertical check valves 2 to 8 inches; all iron valves from ½ inch up; back pressure valves in various patterns and sizes; standard pattern gate valves, with solid double-faced wedges, 2 to 30 inches; medium pressure, 2 to 18 inches, with or without by-pass. Flanges, A. S. M. E. standard dimensions.



Fig. 325 Iron Body Gate Valve, Standard Pattern

Digitized by Google

JENKINS VALVES FOR HIGH PRESSURE:



Fig. 128 Brass Globe Valve, Extra Heavy Pattern

Jenkins **Extra Heavy Brass** Valves, Globe, Angle, Cross, Check and other patterns, are suitable for working steam pressures up to and including 300 pounds, or for water and air pressures up to 500 pounds. Carefully designed, well proportioned, handsomely finished, with the most approved features of construction. Sizes ¼ to 3 inches.

Jenkins Extra Heavy Brass Gate Valves furnished either inside Screw, Stationary Spindle or Outside Screw and Yoke. Rising Spindle. Sizes ½ to 3 inches.

Jenkins Extra Heavy Iron Body Valves are suitable for working pressures of 250 pounds steam or 400 pounds water.

Globe, angle and cross valves made in sizes 2 to 12 inches; valves from 5 inches up can be supplied with by-passes which are cast integral with the body.

Horizontal and angle check valves 2 to 6 inches, swing check valves, 2 to 8 inches; Y valves, 2 to 3 inches; automatic equalizing stop and check valves, 4 to 8 inches.

Gate valves with inside screw or outside screw and yoke, in sizes 1½ to 24 inches. Valves can be furnished with by-passes, and their use is particularly recommended on sizes 8 inches and larger. All flanges, A. S. M. E. Extra Heavy Dimensions.



Fig. 164c Iron Body Angle Valve with By-Pass, Extra Heavy Pattern

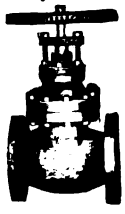


Fig. 203 Iron Body Gate Valve, Inside Screw, Extra Heavy Pattern



Fig. 204 Iron Body Gate Valve, Extra Heavy Pattern, Outside Screw and Yoke



Fig. 204b Iron Body Gate Valve with By-Pass, Extra Heavy Pattern

JENKINS CAST STEEL VALVES:

Jenkins Cast Steel Valves are made in globe, angle, gate and check patterns, which experience has shown are perfectly adapted for the severe conditions incident to high pressure, superheated steam service.

The valves are suitable for working steam pressures up to 350 pounds, and total temperature of 800 degrees F. Furnished in practically the same sizes as the Extra Heavy Iron Body Valves.



Fig. 293 Automatic Equalizing Stop and Check Valve

MECHANICAL RUBBER GOODS:

In this line we are offering engineering requisites which are the result of over 50 years of progressive effort. We are the original manufacturers of rubber composition discs for valves and unvulcanized sheet packing.

Jenkins '96 is the name of our black high grade unvulcanized or self-vulcanizing packing, furnished in sheets or gaskets for all kinds of saturated steam joints. JENARCO is a vulcanized red sheeting. It is very tough and pliable, equally suitable for steam, hot or cold water, and other joints.

Jenkins Compressed Asbestos Jointing for Superheated Steam joints.

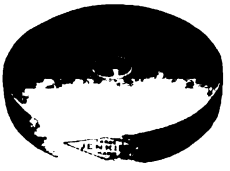


Fig. 227 Pump Valve

Jenkins Pump Valves are made from various compounds. There are pump valves of hard composition, particularly adapted for hot water, as with boiler feed pumps; for oils, acids, and other destructive fluids; semi-hard valves for high pressure cold water service as in mines and elevators, medium soft for cold water, very soft and flexible for low pressure cold water and air. When ordering, state the kind of service in which the valves are to be used, the fluid handled, pressure or head pump is working against, and in all cases give diameter, thickness and size of hole.

All genuine Jenkins Valves bear Diamond Trade Mark, and are absolutely guaranteed to be perfect in workmanship and suitable and efficient in the service for which they are designed.

If specifications call for genuine Jenkins Valves having the name within a Diamond Mark and the Jenkins Signature, there will be no mistake about the valves that go into the installation.

A catalogue of all the Jenkins products, giving sizes, styles and list prices, mailed on request.

SEE OUR ARTICLE IN MECHANICAL ENGINEERING THE JOURNAL OF THE A.S.M.E.

Digitized by Google

THE KELLY & JONES CO.

GREENSBURG, PA.

Manufacturers of Cast Iron, Malleable, Brass and Steel Fittings; Brass, Iron Body and Steel Valves, Cocks, Etc., for Steam, Gas, Water, Air and Oil

CAST IRON, MALLEABLE AND BRASS FITTINGS:

We make every conceivable style and size of screwed cast iron, malleable, brass and steel fittings and for all pressures.



Malleable Fitting



Cast Iron Fitting

All Kelly & Jones Co. screwed fittings are recessed to permit of the easy entrance of the pipe. All threads are cut true to gauge. Will not leak and each fitting is a perfect product.

FLANGED FITTINGS:

We make a flanged fitting for every pressure and purpose, brass, iron or steel, and in all sizes, straight or reducing.



Flanged Fitting



Reducing Flanged Fitting

Dimensions and drilling of Kelly & Jones Co. fittings are in accordance with the latest established standards.

"NIP" UNION:

No Inserted Parts



Union "NIP"

This is one of the simplest Unions made—has only three parts—Nut, Swivel and Thread End.

Nut and Swivel are made of Malleable Iron, and Thread End of Brass. This brass to iron seat and thread connection insures a tight joint and permits the union to be reconnected any number of times without injury.

Made in sizes ⅛ to 4″ for 200 pounds working pressure.

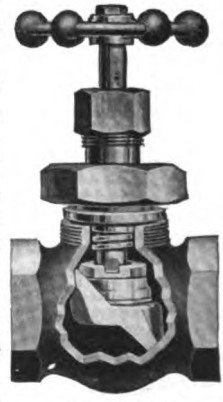
JENKINS TYPE KELLY & JONES BRASS VALVES:

Practical—durable—efficient—economical. Will not leak and can be repacked under full pressure. These K-J Jenkins type brass valves are made of the highest grade steam metal, carefully machined, and are very attractive in appearance. Special pattern for 100 lbs., standard for 125 lbs.

Furnished in globe, angle, cross and check, screwed or flanged, and in all sizes.

"EXCELSIOR" HIGH PRESSURE BRASS VALVES:

For high pressure service, 200 or 300 lbs. of live or superheated steam. Used extensively in modern steam plant construction and in the U. S. Navy. Can be furnished with or without yoke, screwed or flanged, globe, angle, cross and check. Sizes ⅛ to 4″.



"Excelsior" High Pressure Brass Valve

Digitized by Google

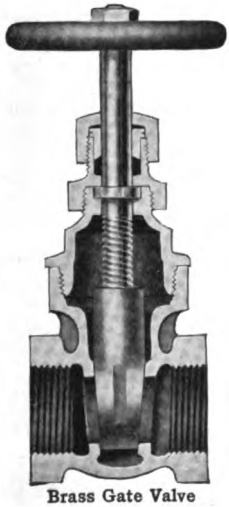
THE KELLY & JONES CO. GREENSBURG, PA.

Send for Catalog "R" illustrating and describing our complete line of valves and fittings.

BRASS GATE VALVES:

The Kelly & Jones line of brass gate valves is most complete. Correctly designed and well proportioned and can be furnished screwed or flanged for the following pressures: 100 lbs., 125, 150, 175, 200, 250 and 1000 lbs. Made with outside screw and yoke if desired for 125 or 250 lbs. pressure.

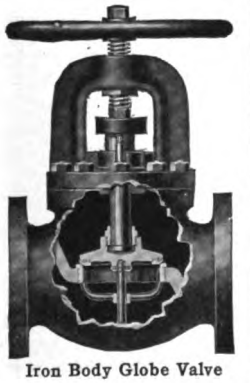
In addition to the solid wedge type illustrated we make brass gate valves with the double disc, either parallel or taper seats.



Brass Gate Valve

IRON BODY VALVES:

All styles and sizes for all pressures and purposes, including globe, angle, cross, check and safety valves. Screwed or flanged, inside screw or O. S. & Y.



Iron Body Globe Valve

K. & J. blow-off valves, globe or angle, screwed or flanged, perform their function correctly and positively, and thereby prolong the life of the boiler. Built on scientific principles and have been in satisfactory use for years.



Globe Blow-Off Valve

Our **NEW STEEL FOUNDRY** *is fully equipped for making in "high quality" steel, any of the valves or fittings shown in our general catalog.*

"SADDLE" GATE VALVES:

All Iron or Iron Body Brass Mounted

This saddle style is a very durable and compact valve, and economical, owing to the simplicity of construction. The steel saddle around the body of the valve holds the bonnet securely in place, and can easily be removed, permitting of access to the interior of the valve for cleaning or repair purposes. Opens to the left and has a rising spindle.



"Saddle" Gate Valve

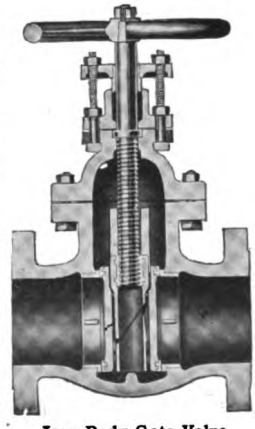
The solid disc in this valve is very narrow and V-shaped at the bottom, and can, therefore, be seated more readily when dirt and sediment are collected between the seats in the valve. Screwed or flanged, sizes ½ to 6".

IRON BODY GATE VALVES:

Solid Wedge or Double Disc

Our iron body gate valves can be furnished screwed or flanged, with or without yoke and by-pass and for 25, 125, 175, 250 and 1000 lbs. pressure.

These valves are also made all iron for temperatures exceeding 325° Fahrenheit and for handling cyanides, acids, and other solutions injurious to brass.



Iron Body Gate Valve Double Disc

Digitized by Google

THE LUNKENHEIMER CO.

EXECUTIVE OFFICES AND FACTORIES

CINCINNATI, OHIO, U. S. A.

NEW YORK	CHICAGO	BOSTON	LONDON
129-135 Lafayette St.	568 W. Washington Boulevard	136-138 High St.	35 Great Dover St., S. E.

Manufacturers of High Grade Engineering Specialties

PRODUCTS:

Catalog No. 58 procurable upon request.

Valves

Bronze	Engine Throttle
Iron	Safety Non-return
Cast Steel	Stop Check
Anti-acid	Needle
Globe	Radiator
Angle	Regulating Check
Cross	Blow-off
Check	Pop Safety
Gate	Relief

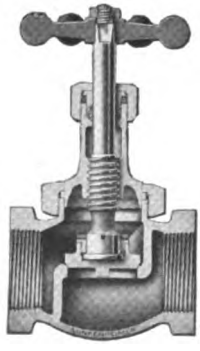
Lubricators

For Steam, Gas, Gasoline and Diesel Engine and Compressor Cylinders.

Oil and Grease Cups
Oil Pumps
Oiling Devices
Injectors and Ejectors
Water Columns and Gauges
Gauge Cocks
Whistles
Ground Key Work
Low Water Alarms
Fusible Plugs
Unions
Bronze Pipe Fittings
Automotive Accessories

Generator Valves
Carburetor Check Valves
Gasoline Engine Primers
Priming Cups
Gasoline Strainers
Grease Cups
Unions and Cocks, Etc.

BRONZE REGRINDING GLOBE, ANGLE AND CROSS VALVES:

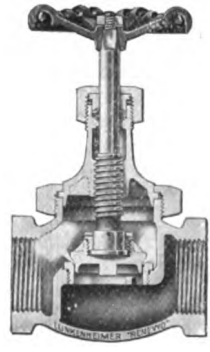


Materials: Body and trimmings of "Valve-Bronze."

Patterns: Medium, sizes ⅛ to 4 inches, for 200 pounds, and Extra Heavy, sizes ¼ to 4 inches, for 300 pounds working steam pressure. Also procurable in Outside Screw, Flanged or Screw Yoke Patterns.

Features: Seating surfaces regrindable; all parts renewable; stuffing box repackable under pressure when valve is wide open; flow areas in excess of pipe areas.

BRONZE "RENEWO" GLOBE, ANGLE AND CROSS VALVES:



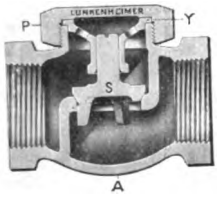
Materials: Body and majority of trimmings of "Valve-Bronze;" seat and disc of "Valve-Nickel."

Patterns: Medium for 200 pounds and Extra Heavy for 300 pounds working steam pressure, in sizes ¼ to 3 inches, inclusive. Also procurable in Outside Screw Flanged Yoke Pattern.

Features: Seating surfaces regrindable; all parts renewable including the nickel seat and disc, making these valves practically indestructible; seating surfaces self-cleansing; stuffing box repackable under pressure when valve is wide open; self-cooling handwheel; flow areas in excess of pipe areas.

Digitized by Google

BRONZE REGRINDING HORIZONTAL ANGLE AND VERTICAL CHECK VALVES:

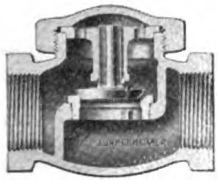


Materials: Body and trimmings of "Valve-Bronze."

Patterns: Medium sizes ⅛ to 4 inches inclusive, for 200 pounds, and Extra Heavy, sizes ¼ to 4 inches inclusive, for 300 pounds working steam pressures. Also procurable with flange instead of screw cap.

Features: Disc properly guided at both top and bottom, insures perfect seating; seating surfaces regrindable; all parts renewable; flow areas in excess of pipe areas.

BRONZE "RENEWO" HORIZONTAL AND ANGLE CHECK VALVES:

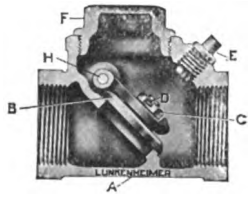


Materials: Body, cap and disc guide of "Valve-Bronze;" seat and disc of "Valve-Nickel."

Patterns: Medium for 200 pounds, and Extra Heavy for 300 pounds working steam pressures, sizes ¼ to 3 inches inclusive.

Features: Disc properly guided at both top and bottom insures perfect seating; seating surfaces regrindable; all parts renewable including the nickel seat and disc, making these valves practically indestructible; flow areas in excess of pipe areas.

BRONZE SWING CHECK VALVES:



Materials: Body and trimmings of "Valve-Bronze."

Patterns: Medium for 200, and Extra Heavy for 300 pounds working steam pressures, sizes ¼ to 3 inches inclusive. Also procurable with flange instead of screw cap.

Features: Practically straightway flow-channel with flow areas in excess of pipe areas; two renewable disc-carrier bearings, insuring constant alignment of disc; seating surfaces regrindable; all parts renewable.

BRONZE DOUBLE DISC GATE VALVES:



Materials: Body and trimmings of "Valve-Bronze."

Patterns: Medium, sizes ¼ to 3 inches inclusive, for 150 pounds working steam pressure.

Features: Ball and socket bearing between the discs provides greatest degree of flexibility in seating engagement; all parts renewable; stuffing box repackable under pressure when valve is wide open; pressure can be taken from either end.

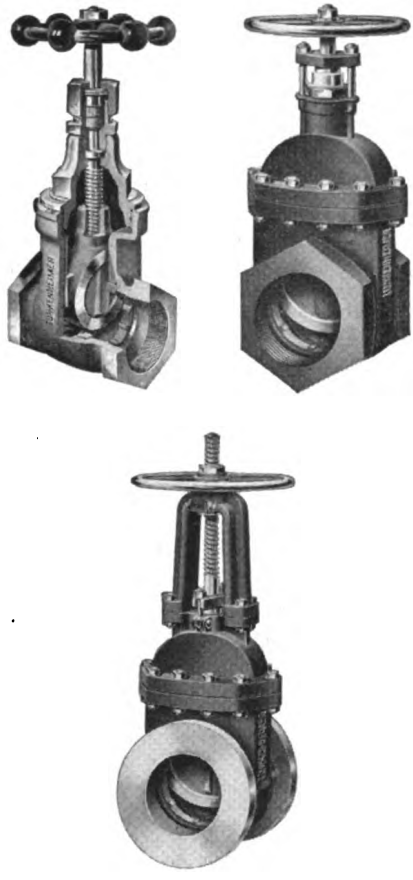
(Continued on next page)

Digitized by Google

(Continued from preceding pages)

THE LUNKENHEIMER CO. CINCINNATI, OHIO

BRONZE WEDGE DISC GATE VALVES:

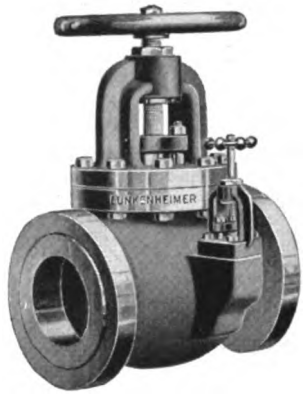


Materials: Body and trimmings of "Valve-Bronze."

Patterns: Screwed Bonnet Inside Screw, Medium Pattern, sizes ¼ to 3 inches inclusive, for 200 pounds, and Extra Heavy, sizes ½ to 3 inches inclusive, for 300 pounds working steam pressures; Screwed Yoke Outside Screw, Medium Pattern, sizes ¾ to 3 inches inclusive, for 200 pounds, and Extra Heavy, sizes 1 to 3 inches inclusive, for 300 pounds working steam pressure. Flanged Bonnet Inside Screw and Flanged Bonnet and Yoke Outside Screw, sizes 2 to 8 inches inclusive, Medium Pattern for 125 pounds and Extra Heavy for 250 pounds working steam pressures.

Features: Double seated permitting pressure to be taken from either end; stuffing box repackable under pressure when valve is full open; all parts renewable including the seats on all sizes with exception of ¼ to ¾ inches inclusive.

IRON BODY FLANGED YOKE BONNET GLOBE, ANGLE AND CROSS VALVES:



Materials: Body, bonnet or yoke of "Valve-Iron." Bearing parts of "Valve-Bronze." Also furnished with Cast Steel body, bonnet or yoke and with seat and disc of "Valve-Nickel."

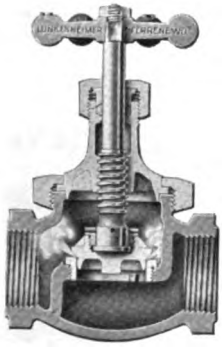
Patterns: Standard Pattern, sizes 2 to 12 inches inclusive, for 125 pounds working steam pressure; Heavy Pattern, sizes 2 to 8 inches inclusive, and with Interior By-Pass, 3½ to 12 inches inclusive, for 175 pounds working pressure; Extra Heavy Pattern, sizes 2 to 8 inches inclusive, and with Interior By-Pass, 3½ to 12 inches inclusive, and Exterior By-Pass, 5 to 12 inches inclusive, for 250 pounds working steam pressure.

Features: Seating surfaces regrindable; all parts including the seat and disc renewable; self-cleansing seating surfaces; stuffing box repackable under pressure when valve is wide open; flow areas in excess of pipe areas.

Digitized by Google

THE LUNKENHEIMER CO. CINCINNATI, OHIO

IRON BODY "FERRENEWO" GLOBE, ANGLE AND CROSS VALVES:



Materials: Body of "Valve-Iron;" seat and disc of "Valve-Nickel;" other trimmings of "Valve-Bronze."

Patterns: Screw Ends only. For 150 pounds working steam pressure.

Features: Self-cleansing seating surfaces; regrindable seating surfaces; all parts renewable including the nickel seat and disc; stuffing box repackable under pressure when valve is wide open; flow area in excess of pipe areas.

IRON BODY "FERRENEWO" CHECK VALVES:



Materials: Body of "Valve-Iron;" seat and disc of "Valve-Nickel;" disc-guide and cap of "Valve-Bronze."

Patterns: Screw Ends only, sizes ¼ to 2 inches inclusive, for 150 pounds working steam pressure.

Features: Disc properly guided at both top and bottom insures perfect seating; seating surfaces regrindable; all parts renewable including the nickel seat and disc; flow areas in excess of pipe areas.

IRON BODY HORIZONTAL AND ANGLE CHECK VALVES:



Materials: Body and cap of "Valve-Iron;" seat, disc and disc-guide of "Valve-Bronze." Also furnished with seat and disc of "Valve-Nickel."

Patterns: Standard Pattern, sizes 2 to 12 inches inclusive, for 125 pounds working steam pressure; Extra Heavy Pattern, sizes 2 to 8 inches inclusive, for 250 pounds working steam pressure.

Features: Disc properly guided at both top and bottom insures perfect seating; seating surfaces regrindable; all parts renewable including the seat and disc; flow areas in excess of pipe areas.

IRON BODY SWING CHECK VALVES:



Materials: Body and Cap of "Valve-Iron." Bearing parts of "Valve-Bronze." Also procurable with Cast Steel body and cap. Seat and disc may be had of "Valve-Nickel."

Patterns: Standard Pattern for 125 pounds working steam pressure and Extra Heavy for 250 pounds working steam pressure, sizes 2 to 8 inches.

Features: Practically straightway flow-channel. Two bronze side plugs provided as disc carrier bearings which are renewable as are all other parts; seating surfaces regrindable.

(Continued on next page)

Digitized by Google

(Continued from preceding pages)

THE LUNKENHEIMER CO. **CINCINNATI, OHIO**

IRON BODY
"VICTOR" GATE VALVES:



Outside Screw and Yoke



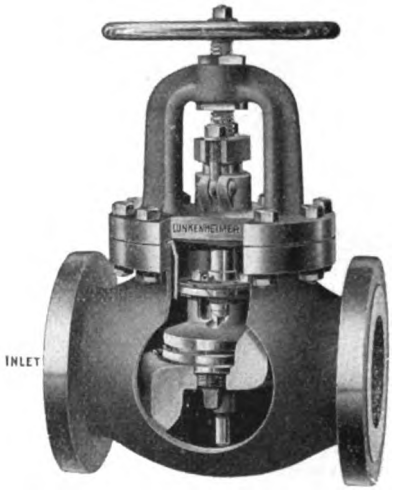
Inside Screw Stationary Stem

Materials: Body, bonnet or yoke of "Valve-Iron." Bearing parts of "Valve-Bronze." Can be procured with seat and disc of "Valve-Nickel" or body, yoke or bonnet can be had of Cast Steel.

Patterns: Standard Pattern, sizes 2 to 8 inches inclusive, for 125 pounds working steam pressure and sizes 10 to 24 inches inclusive, for 100 pounds working steam pressure. Medium Pattern, sizes 2 to 24 inches inclusive, for 125 pounds working steam pressure. Heavy Pattern, sizes 2 to 24 inches inclusive, for 175 pounds working steam pressure. Extra Heavy Pattern, sizes 1½ to 16 inches inclusive, for 250 pounds working steam pressure. Extra Heavy Pattern can be had with By-Pass in 5 inch and larger sizes. Made with Inside Screw Stationary Stem and Outside Screw Rising Stem. Can be procured in Sliding Stem Pattern for quick opening and closing; with Angle Outlet; Stationary Stem Pattern with Indicator to show degree of opening; with Gear Lift; with Hydraulic Lift, or Electrically Operated.

Features: Wedge Disc, double seated, permitting pressure to be taken from either end; all parts including the seat and disc are renewable; stuffing box repackable under pressure when valve is wide open.

IRON BODY
BALANCED THROTTLE VALVES:



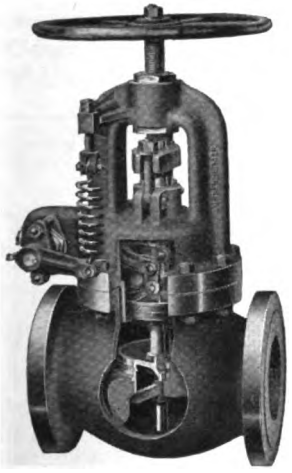
Materials: Body and yoke of "Valve-Iron." Bearing parts of "Valve-Bronze." Can be procured with seat and disc of "Valve-Nickel" or body and yoke can be had of Cast Steel.

Patterns: Globe or Angle Patterns with Flange Ends only, sizes 4 to 8 inches, for 250 pounds working steam pressure.

Features: Simplicity of construction combined with efficiency make these Valves particularly adapted for engine throttling purposes. Interior By-Pass facilitates operation; spring seating surfaces accommodate themselves to any slight distortions caused by expansion and contraction; seating surfaces regrindable; all parts, including seat and disc, are renewable; can be connected with stem pointing vertically upward or horizontally.

Digitized by Google

IRON BODY SAFETY NON-RETURN VALVES:

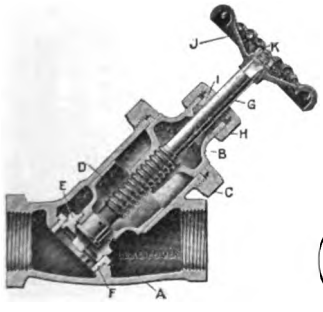


Materials: Body and yoke of "Valve-Iron." Bearing parts of "Valve-Bronze" can be procured with seat and disc of "Valve-Nickel," or body and yoke can be had of Cast Steel.

Patterns: Globe or Angle Patterns with Screw or Flange Ends for 250 pounds working steam pressure.

Features: Will automatically close and instantly cut out the boiler in battery to which it is connected should the pressure within the boiler suddenly drop below that in the header; permits continued operation of other boilers in battery; will not open until pressure in boiler equals that in header; can be connected with stem pointing vertically upward or horizontally; self-cleansing seating surfaces; seating faces regrindable; all parts including seat and disc renewable.

BRONZE "RENEWO" STRAIGHTWAY BLOW-OFF VALVES:



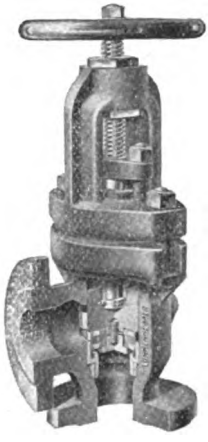
SEE OUR ADVTS. IN MECHANICAL ENGINEERING THE JOURNAL OF THE A.S.M.E.

Materials: Seat and Disc of "Valve-Nickel;" other trimmings and body of "Valve-Bronze."

Patterns: Medium for 200 and Extra Heavy for 300 pounds working steam pressures, in sizes ¾ to 2½ inches inclusive.

Features: Self-cleansing seating surfaces; regrindable seating surfaces; all parts renewable including nickel seat and disc; stuffing box repackable under pressure when valve is wide open.

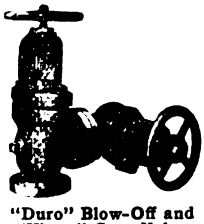
IRON BODY "DURO" BLOW-OFF VALVES:



Materials: Body and yoke of "Valve-Iron." Bearing parts of "Valve-Bronze."

Patterns: Screw or Flange Ends for 250 pounds working steam pressure, sizes 1¼ to 2½ inches, inclusive.

Features: Self-cleansing seating surfaces; disc reversible and provided with two alloy faces which can be melted out and new alloy inserted; all parts, including seat, are renewable. A combination extensively used is that of the "Duro" with a "Victor" Gate Valve bolted between it and the boiler. The Gate Valve serves as a safety device in event of accident to the Blow-Off Valve and enables repairing of the latter while the boiler is under pressure.



"Duro" Blow-Off and "Victor" Gate Valve Combination

Digitized by Google

NELSON VALVE COMPANY

CHESTNUT HILL, PHILADELPHIA, PA.

Branches and Sales Offices

ATLANTA	CHICAGO	LOS ANGELES	SAN FRANCISCO
BOSTON	CLEVELAND	NEW YORK	SYRACUSE
BUFFALO	DETROIT	PITTSBURGH	LONDON, ENG.

Manufacturers of Gate, Globe, Check, Non-Return, Back-Pressure, Blow-Off, and Motor-Operated Valves, in Bronze, Iron, Steel and Monel; and Bronze, Iron and Steel Expansion Joints.

The Nelson line embraces every type of valve employed in the highest class power and industrial installations, including specially constructed valves for superheated steam and for acids, alkalies, oils and other special service. 26 years' experience insures to Nelson Valve users the highest possible degree of service and construction.



Iron Gate



Double-Disc Detail

Showing Discs Drawn Slightly Away from Normal Position against Central Wedge

GATE VALVES:

Bronze: Nelson Bronze Gate Valves are specially made for various pressures—125 to 350 pounds—and ratings. They are fitted with monel trimmings for superheat service.

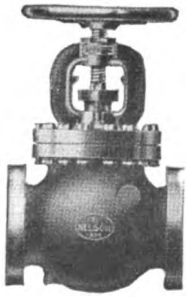
Iron: Simplicity and strength of construction mark the Nelson Iron Body Gate Valves. Absolute tightness is insured by the double-disc, taper-seat construction, wherein the discs move freely, without scraping, to their lowest point and then adjust themselves perfectly to the seats, under the spreading action of the central wedge. There are only three internal parts (see illustration).

Steel: Nelson Steel Gate Valves are made with the solid wedge or double-disc construction, and mounted with various metals suitable to different temperatures. Motor operation is provided for valves to be used in inaccessible positions, or in service where it is desirable to have instant control over them from one or more remote points.

GLOBE, ANGLE AND CROSS VALVES:

Bronze: Nelson Bronze Globe Valves are made for pressures from 125 to 350 pounds, trimmed with monel and other metals suitable to various temperatures. Heavy construction of important parts is characteristic.

Iron: Nelson Iron Body Globe Valves have the bolted bonnet construction, the through-bolts providing surplus strength at this vital point. They are suitable for pressures from 125 to 300 pounds.



Extra Heavy Globe

Steel: Nelson Steel Globe Valves are provided with monel, nickel bronze, or other mountings for special conditions. They are of extra-heavy construction, with through-bolted bonnets.

CHECK VALVES:

Bronze: Nelson Bronze Check Valves are supplied in cup or swing-check types for various pressures. Several designs can be used vertically or horizontally.

Iron: Nelson Iron Body Check Valves are made in swing-check, non-return stop and check, and cushion-check types for various pressures. Heavy construction of body and bonnet, with the through-bolted feature, makes these valves safe against severe stresses.

Steel: Nelson Steel Check Valves are supplied in the same types as are the iron body checks, of extra heavy construction. The disc and piston are cast in one piece of monel or nickel bronze—no parts to work loose.

SPECIALTIES:

Nelson Seatless Blow-Off Valve: Eliminates troubles caused by usual seat and disc blow-off valves. Packing is protected from force of blow-down, and lasts for years. Piston is perfectly balanced, and equalization ports insure easy operation. 2000 in use more than eight years.

Nelson Quick-Opening Blow-Off Valves: A strong, simply designed valve with minimum number of working parts. Lever operated type. Especially adapted for use in tandem with the Nelson Seatless Blow-Off Valve, or in any position where a heavy quick-opening valve is desirable.

Nelson Expansion Joints: A complete line of well-designed and heavily constructed expansion joints, in bronze, iron and steel.

VALVES FOR SPECIAL CONDITIONS:

The Nelson Valve Company is well equipped to produce valves built to unusual specifications for special service.

Tell us your requirements.

SEE OUR ADVTS. IN MECHANICAL ENGINEERING THE JOURNAL OF THE A.S.M.E.

Complete illustrated catalogue of Nelson standard lines will be sent at your request.



Seatless Blow-Off Valve

Digitized by Google

SCOTT VALVE MFG. CO.

DETROIT, MICH.

WESTERN BRANCH: Scott Valve Co., CHICAGO, ILL.

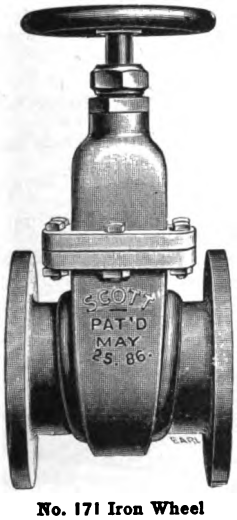
Manufacturer of Valves for Every Service

SCOTT BRASS AND IRON BODY GATE VALVES:



Made in three weights for standard, medium and extra heavy pressures. They are remarkable for their simplicity of construction. Designed with a special view to strength and compactness.

All fitted with our Scott Double Disc Cylindrical Wedge, which makes a full circular bearing upon the back of the



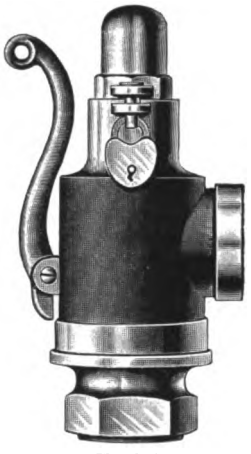
No. 171 Iron Wheel
All Bronze, Flanged with Bolted Top

disc or gate, thus insuring a perfect seating and the impossibility of the discs springing, bending or getting out of shape.

SCOTT POP SAFETY VALVES FOR SAFETY:

The most sensitive and reliable made. The adjustable screw threaded ring with angular face prevents all wear on seats. They are entirely frictionless.

Cannot cock, tilt or stick to seat. Opens precisely at the predetermined pressure, reduces the pressure quickly and closes with the smallest loss of pressure.



No. 152
Side Outlet

Blow-off pressure is adjustable to suit varying needs. Cut shows the Scott brass patent marine and stationary lock-up pop safety valve, also made with iron body and phosphor bronze seats.

All our safety valves meet with A. S. M. E. Specifications.

Send for new big valve catalogue. A valuable book for your office.

Digitized by Google

PITTSBURGH VALVE, FOUNDRY & CONSTRUCTION CO.

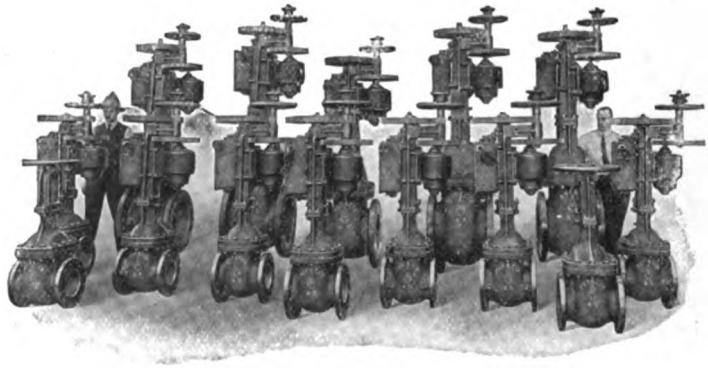
P. O. BOX 1016, PITTSBURGH, PA.

Engineers, Founders, Pipe-Fitters and Machinists
Sole Manufacturers of Gulland Automatic Stand Pipes

BRANCH OFFICES AND AGENTS

NEW YORK, N. Y., 30 Church St.
CLEVELAND, OHIO, 1250 Kirby Bldg.
BIRMINGHAM, ALA., Young & Vann Sup. Co., 1809 First Ave.
BOSTON, MASS., 19 Milk Street
CHICAGO, ILL., 650 McCormick Bldg.
DENVER, COLO., Mountain States Mach. Co.
PHILADELPHIA, PA., 1323 Widener Bldg.
SAN FRANCISCO, CAL., E. A. Keithley, Rialto
TORONTO, CANADA, W. M. Campbell, 32 Albany Street

ATWOOD



ATWOOD

192

Group of Motor-Operated Gate Valves

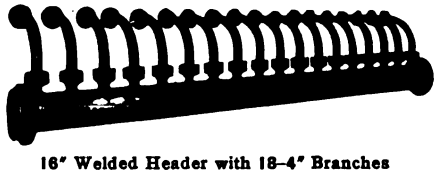
VALVES, FITTINGS AND APPLIANCES of every description for Steam, Gas, Water, Air and Hydraulic Piping.

SPECIAL VALVES AND FITTINGS for hydraulic installations. Motor Operated and Cylinder Operated Gate Valves, **Hydraulic Operating Valves** for blast furnace doors, bells, steel mill tables and rolls.

COMPLETE PIPING CONTRACTS EXECUTED:

We are prepared to install valves, fittings or piping anywhere and under any conditions. A large corps of expert fitters is constantly employed, and this branch of work is in charge of competent superintendents and foremen. Large contracts are placed in charge of erecting engineers from the Engineering Department.

Special facilities for casting and machining large pipe fittings, furnace castings, etc.



16" Welded Header with 18–4" Branches

PIPE CUTTING, BENDING AND WELDING:

Branches and manifold outlets fabricated by our patented Interlock Method.

Digitized by Google

PITTSBURGH VALVE, FOUNDRY & CONSTRUCTION CO. PITTSBURGH, PA.

STANDARD LINES OF GATE VALVES:

Specifications for material

Grey Iron—22,000 lb. per sq. in. tensile strength.

Semi Steel—33,000 lb. per sq. in. tensile strength.

Parallel seat, 50 lb. working pressure. 75 lb. test pressure

Sizes 14″ to 72″ cast iron. Low pressure. For water, gas, air or exhaust steam. Extremely close face to face, invaluable in complicated piping connections.



50 lb. Parallel Seat Gate Valve. Close Pattern

Parallel seat, 125 lb. working pressure. 300 lb. test pressure

Sizes 2″ to 48″ cast iron. Standard pressure. For water, air, steam or gas. Fully bronze mounted. Especially adapted to water distribution.

Parallel seat, 200 lb. working pressure. 400 lb. test pressure

Sizes 1½″ to 16″ cast iron. Largely used for natural gas under the lower pressures. Furnished either all iron or iron body bronze mounted.

Parallel seat, 400 lb. working pressure. 800 lb. test pressure

Sizes 3″ to 20″ semi steel. In extensive use for the transmission of natural gas. Furnished either with or without bronze mountings.

Parallel seat, 500 lb. working pressure. 1500 lb. test pressure



4″ 1000 lb. Gas Line Gate Valve

Sizes 2″ to 12″. For water or oil at pressure noted. Semi steel with solid bronze mountings.

Parallel seat, 1000 lb. working pressure. 1500 lb. test pressure

Sizes 2″ to 12″ semi steel. High pressure gas valve used chiefly at the gas wells and on feeders in the gas fields.

Parallel seat, 1500 lb. working pressure. 2000 lb. test pressure

Sizes 2″ to 10″ semi steel. For hydraulic service and extreme natural gas rock pressures.

Taper seat, 175 lb. working pressure. 500 lb. test pressure

Sizes 2″ to 16″ semi steel. A valve for medium steam pressures from 125 lb. to 175 lb. where a less expensive valve than the 250 lb. type is desired.

Taper seat, 250 lb. working pressure. 800 lb. test pressure

Sizes 1½″ to 28″ of semi steel with solid bronze mountings for ordinary steam pressures. Sizes 2″ to 24″ for superheat steam up to a temperature of 500 degrees Fahrenheit of cast steel with full monel mountings, monel stems and cooling chamber to protect packing.



14″ Cast-Steel Gate Valve for Superheat Steam

Taper seat, 1000 lb. working pressure. 2000 lb. test pressure

Sizes 1½″ to 12″. The strongest valve possible to make in its weight, all surfaces being cylindrical or spherical segments.



8″ 1000 lb. Hydraulic Gate Valve

Gate valves for any pressure

Designs and quotations furnished for valves for special conditions or higher pressures. Materials used are those best adapted to service.

Digitized by Google

READING VALVE AND FITTINGS CO.

(PRATT AND CADY DIVISION)

HARTFORD, CONN.

Manufacturers of Valves and Asbestos Packed Cocks in Bronze and Iron

BOSTON HARTFORD NEW YORK PHILADELPHIA PITTSBURGH READING
CHICAGO DETROIT ST. PAUL SAN FRANCISCO CLEVELAND HOUSTON

BRONZE GLOBE AND ANGLE VALVES:

Renewable Disc Type:



Renewable Disc Globe Valve

Made in sizes ⅛″ to 3″ inclusive in two weights suitable for 150 and 250 pounds steam, respectively.

The 150-pound line has the well known P&C renewable asbestos disc; the 250-pound line has a renewable solid bronze disc and renewable seat ring.

The 150-pound valves are made hub bonnet or union bonnet, the 250-pound valves, hub bonnet only.

Regrinding Type:



Bronze Regrinding Globe Valve

Made in sizes ⅛″ to 3″ inclusive in two weights suitable for 200, 250 and 300 pounds steam, respectively.

These valves are of the union bonnet type and carry certain special features which make them particularly suitable for severe service. The 300-pound line can be equipped with renewable seat rings when so ordered.

IRON BODY GLOBE AND ANGLE VALVES:



45° Seat Iron Body Globe Valve

Made in two styles, one with renewable asbestos disc for 150-pound steam and the other with 45-degree seat in two weights, 150 and 250 pounds steam, respectively.

The renewable asbestos disc type is made in sizes 2″ to 14″ inclusive.

The 45-degree seat valves are made in sizes 2″ to 10″ inclusive.

These valves are all built with renewable seat rings, can be packed under pressure and all parts renewed without taking the valve from the pipe line.

BRONZE GATE VALVES:



Bronze Renewable Seat Gate Valve

Made all sizes and in four weights suitable for 125 pounds steam, 150 pounds steam, 250 pounds steam and 800 pounds water, respectively. The 150, 250 and 800-pound lines have renewable seat rings which can be changed without removing the valve from the line.

All P&C gate valves are equipped with double faced bronze wedges which permit the pressure to be applied upon either side and are reversible.

IRON BODY WATER GATE VALVES:



Iron Body Bell End Gate Valve

Sizes 10″ to 24″ for 50 to 75-pounds working pressures. We also make hydraulic valves for 800 to 1500 pounds working pressure in sizes 1½″ to 8″ with port full sized or of the same diameter as double extra heavy pipe. These valves are bronze trimmed and have a double disc, parallel face gate especially designed to hold water. In opening, one turn of the spindle releases the wedge in the gate allowing the valve to open freely, without friction. Furnished with inside screw or with outside screw and yoke and with screwed, flanged or bell ends.

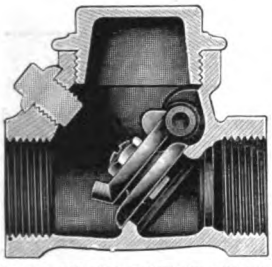
Digitized by Google

READING VALVE AND FITTINGS CO. HARTFORD, CONN.

(PRATT AND CADY DIVISION)

SWING CHECK VALVES:

Bronze and Iron:



Bronze Horizontal Swing Check Valve

Bronze swing check valves made in sizes ⅛″ to 3″ inclusive for all pressures and purposes.

Iron body swing check valves made in sizes 2″ to 24″ inclusive for 150 pounds water; sizes 3″ to 12″ inclusive conform to Fire Underwriters specifications. We also make a line suitable for 300 pounds water in sizes 2″ to 12″ inclusive. Working parts for any of these valves can be renewed or the disc reground without removing the valve from the line. The only tools necessary for regrinding are a wrench and brace and bit.

Made in screwed, flanged or bell ends.

IRON BODY GATE VALVES:

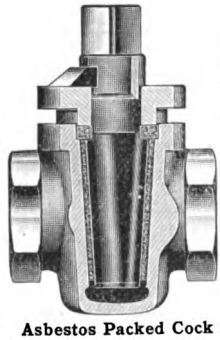


Standard Iron Body Gate Valve

Made in sizes 2″ to 16″ for 150-pound and 200-pound steam working pressure and 2″ to 24″ sizes for 125 pounds and for 250 pounds steam working pressure. The 125-pound line will be furnished built to Underwriter specifications if desired. All the valves are bronze trimmed and have bronze faced solid wedges except the 125-pound valves which can be furnished with a new design of split wedge, so made as to have the advantages, but not the disadvantages usual to a split wedge. These valves are made in the inside screw, outside screw and yoke and quick opening type and with screwed, flanged or bell ends.

ASBESTOS PACKED COCKS:

Bronze and Iron:



Asbestos Packed Cock

Bronze cocks in sizes ¼″ to 4″ for 150 and 250 pounds steam working pressures, respectively.

Iron cocks in sizes ¼″ to 4″ for 100 to 125, 150 to 200, and 250 pounds steam working pressures, respectively. Also made in sizes up to 10″ for the various pressures, with worm gear operating attachment.

The dove-tailed "U" shaped grooves in the body are packed with prepared asbestos and afterwards subjected to a special vulcanizing process. An asbestos ring is used on the shoulder of the plug for top packing. The plug is carefully finished and barffed to make it rust proof. It has no metallic bearing, coming in contact only with the asbestos which compensates for the differential expansion of the plug and body. These cocks give excellent results as boiler blow-off valves and on other severe services where other types of valves fail.

STEEL VALVES:

We manufacture at our Reading plant, a full line of steel valves, including gate valves, automatic stop and check valves, globe and angle valves and swing check valves. These are made for 250 pounds and 350 pounds steam working pressure. The lighter valves are a departure in steel valve manufacture to make available the advantages of steel valves for lower pressure and temperature service without unnecessary weight or cost. They are a companion line to Reading medium cast steel fittings.

The 350-pound steam pressure valves are also suitable for 800 pounds cold water or oil pressure and there are also hydraulic valves for 1500 and 3000 pounds working pressure.

SEE OUR ADVTS IN MECHANICAL ENGINEERING THE JOURNAL OF THE A.S.M.E.

Digitized by Google

YARNALL-WARING COMPANY

7603–20 QUEEN ST., CHESTNUT HILL, PHILADELPHIA

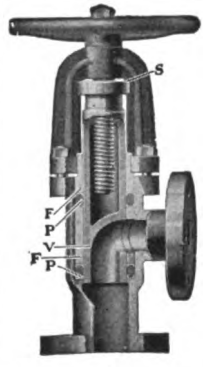
Branches or Representatives
in Principal Cities

Manufacturers of YARWAY Power Plant Specialties

YARWAY Products

POWER PLANT SPECIALTIES
are designed to promote economy and efficiency in the power plant.

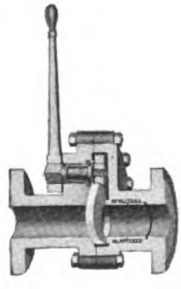
YARWAY SEATLESS BLOW-OFF VALVE:



No seat to leak. Packing is automatically tightened after valve is closed and loosened before opening—is at all times protected from blast of blow-down. More than 20,000 sold.

Operation: In closing valve, shoulder S on plunger V engages the loose follower gland F, compressing packing P above and below the port, making an absolutely tight valve.

YARWAY DOUBLE-TIGHTENING BLOW-OFF VALVE:

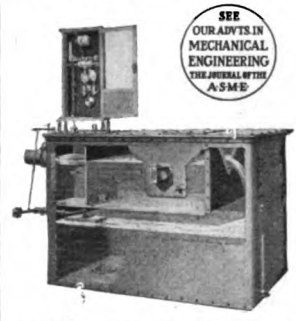


A quick-opening valve especially adapted for use in tandem with the Yarway Seatless Blow-Off Valve. Has unique feature of sealing bushing on inlet side, making it *double-tightening* on both sides of gate. Tandem installations have proved highly successful.

YARWAY PIPE CLAMPS:

Easily and quickly attached, even in out-of-the-way places. Stop leaks completely and permanently. The Yarway Pipe-Joint Clamp for leaky joints; the Yarway Holtite Clamp for holes and splits in straight sections. Thousands in use.

YARWAY-LEA V-NOTCH METER:



The Standard instrument for the measurement of boiler feed water, blow-off discharge, condensate, commercial liquids, etc. Provides permanent record, accurate within 1½%. Keeps the power plant in a state of continuous daily test. Over two thousand in use in all parts of the world.

YARWAY BOILER SKIMMER:

A continuous, circulating surface blow, which prevents the formation of scale by continuously and automatically removing suspended foreign matter from the feed water. No expense for maintenance; practically operates itself. Hundreds in successful service.

YARWAY ADJUSTABLE SPRAY HEAD:
(C. C. Thomas Patents)



The *only* spray head that can be adjusted to meet atmospheric conditions. Can be set to secure maximum cooling range under any conditions of temperature or humidity. Can be cleaned of clogging material by flushing from shore. Numerous installations.

YARWAY HYDRAULIC VALVE:
(Caskey Patents)

A pressure-packed valve for use on all sorts of hydraulic machinery. Easily operated, quick-acting, and durable under the heaviest duty.

Bulletins and information concerning any Yarway Product will be promptly forwarded upon request.

Digitized by Google

PAYNE DEAN LIMITED

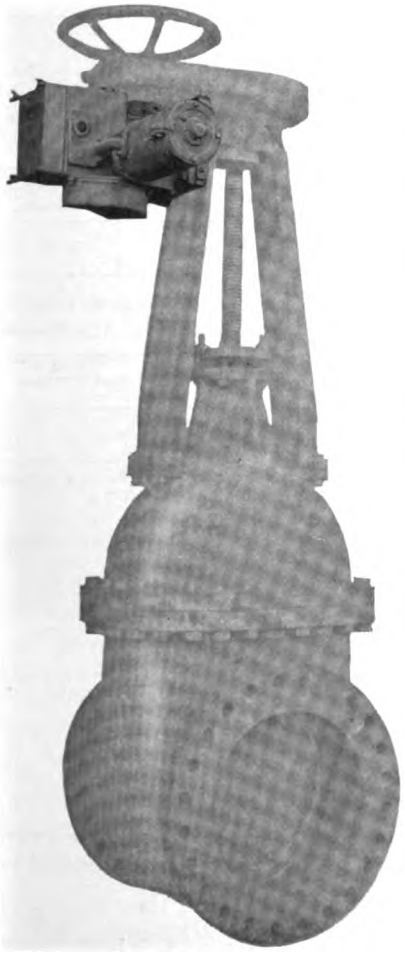
103 PARK AVE., NEW YORK CITY

Electric Valve Control

MADE BY CUTLER HAMMER

DEAN CONTROL

The Dean System, for the remote Control of Gate Valves, is entirely electrical in operation, using a high torque fully enclosed motor as the source of power. This motor runs at a speed of about 2000 R.P.M. and is connected to a system of combined worm and planetary gearing for the purpose of speed reduction to the valve stem.



The gearing is enclosed in an oil tight casing, and the limit mechanism is included in a space above the gearing, the whole, together with motor, forming a single unit with only four holding down bolt holes.

The Dean System drives the valve gate directly into the seat under power, to the exact point of tight closing, after which the trip mechanism releases the motor and gears from the valve stem, so entirely eliminating over travel due to momentum of moving parts.

Control of the valves is secured by small control stations, which are fitted with indicating lights showing the position of the gate. These stations may be placed at as many remote points as desired.

It has become standard practice to protect the steam lines in Central Stations with Dean Control, and this system is being extensively used in the Water Works field.

The equipment is standard with all the valve manufacturers, and can be readily applied to existing valves, this company being in a position to enter into contracts for the complete changeover from hand to electrical operation.

ADVANTAGES:

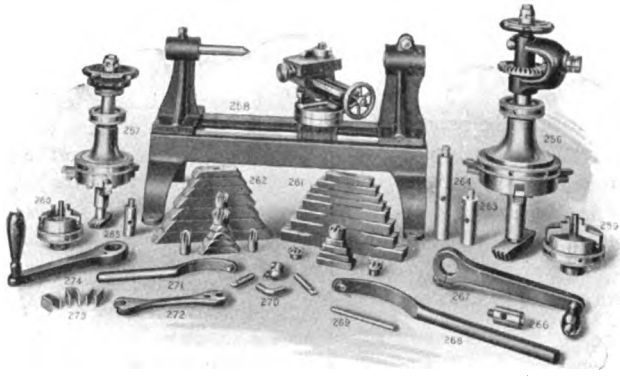
1. Multi Point Control
2. Electrically operated from any circuit
3. Designed for any pressure, size or location
4. No overtravel or jamming of gate
5. Waterproof for vault installation
6. Easily applied to existing valves
7. Standard equipment with valve manufacturers
8. Insures operating condition of valve.

Digitized by Google

THE LEAVITT MACHINE COMPANY

ORANGE, MASS.

Manufacturers of the Dexter Valve Reseating Machine



Outfit No. 6 T-L, Capacity for Reseating Globe Valves ¼-6 Inches

DEXTER VALVE RESEATING MACHINES are known wherever valves are used and are the result of 30 years specializing in valve reseating tools.

198

The Dexter Machines reface worn globe valve seats and discs accurately and leave a seat that is absolutely steam or water tight. The same valve may be reseated from 10 to 20 times without removing the valve body from the pipe line.

Net Prices for Machines
for Flat and Taper Seated Globe Valves

Outfit No	For Valves, Sizes	Price
3 T-L	¼–3	109.38
4 T-L	¼–4	128.13
6 T-L	¼–6	192.88
8 T-L	¼–8	234.38
10 T-L	¼–10	328.13
12 T-L	¼–12	421.88

DEXTER PUMP VALVE RESEATING MACHINES:

These Machines reface the seats in all types of feed, circulating, service and mining pumps.

Price of Pump Outfits
used independently of Globe Valve Machines

Outfit No.	Capacity for Refacing Seats	Price without Cutters
D-H-6	2–7½	46.25
N-15	8–15	81 25

Price of Pump Attachment used with Dexter Globe Valve Reseating Outfit No. 6 T-L.

Attachment No.	Capacity for Reseating	Price without Cutters
D-M-6	2–7 ½	30.00

Add prices of Pump Cutters required to prices of Pump Outfit or Attachment.

Prices of Patent Pump Valve Seat Cutters

Size, inches	Price
2	16.75
2½	16.75
3	18.75
3½	18.75
4	18.75
4½	18.75
5	22.50
5½	22.50
6	22.50
6½	27.50
7	27.50
7½	27.50
8	37.50
10	62.50
12	81.25
14	93.75
15	100.00

Give diameter for pump valve stud for each cutter.

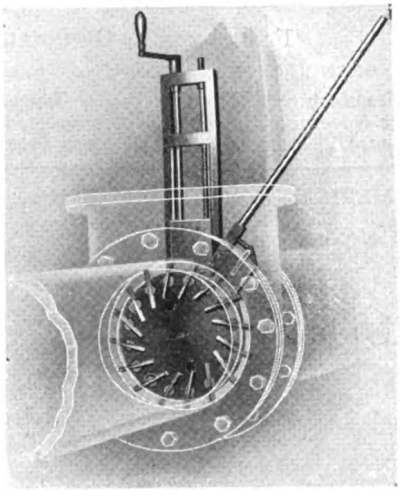
Send for Catalog MEC–23.

Digitized by Google

THE LEAVITT MACHINE COMPANY ORANGE, MASS.

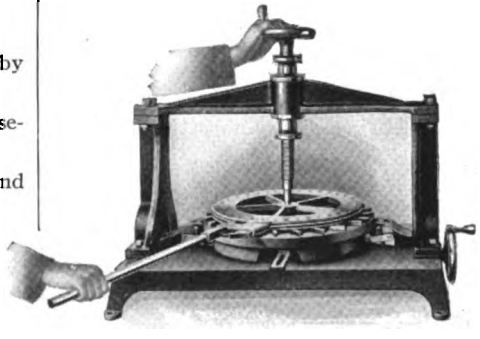
DEXTER GATE VALVE RESEATING MACHINES:

These are as simple and positive in operation as the Dexter Globe Valve Machines. They reface worn gate valve seats and their solid gates or split discs exactly alike, making perfectly steam and water tight valves. The illustration shows the Dexter Gate Valve Machine for repairing gate valve seats within the valve body.



The Dexter attached to the valve body. Note operating hand lever and crank arm for feeding cutters against valve seats.

The disc gate is quickly leveled by turning screw standard on dogs, and securely chucked by turning wheel on end of machine. A few rotations of the cutter operated by the ratchet handle and the disc is refaced.



Refacing the gate is done by chucking it in this simple holder and turning the crank arm and rotating cutter.

Outfit No.	Capacity	Price
2-3-C	1½-3	187.50
2-6-C	1½-6	406.25
2-8-C	1½-8	523.50
2-10-C	1½-10	757.75
2-12-C	1½-12	867.25
2-14-C	1½-14	984.50
2-16-2	1½-16	1140.75

Send for Catalog MEC-23.

Digitized by Google

AMERICAN STEAM GAUGE & VALVE MANUFACTURING CO.

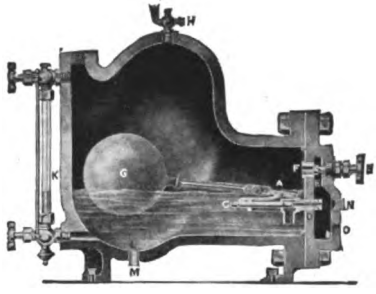
Established 1851

FACTORY AND GENERAL OFFICES, BOSTON, MASS.

BRANCH OFFICES: NEW YORK CHICAGO PITTSBURGH ATLANTA LOS ANGELES

Manufacturers of Steam Traps, Gauges, Valves, Indicators and Kindred Appliances for Governing, Indicating, Measuring, Recording and Controlling Steam, Water, Air, Gas, Oil, Ammonia, and All Other Pressures

AMERICAN IDEAL STEAM TRAP:



Model C—Sectional View

200

This trap is built on extremely rugged lines and is guaranteed for all pressures.

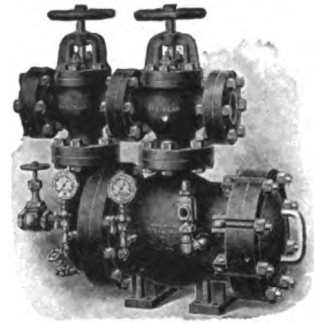
Has a valve discharge orifice much larger than in ordinary traps, which means larger capacity. Consequently a smaller trap can be used. It also enables dirt and scale to pass off and prevents clogging. Valve seat can be renewed without making disconnections.

A heavy Hercules float is used, made of seamless, non-corroding copper. It will resist pressures up to 600 lbs. to the square inch and is guaranteed for the life of trap.

Valve seats are under a continuous water seal, thus cannot leak live steam.

Send for Catalog "A Steam Trap Catechism."

AMERICAN H_2O GREASE EXTRACTING FEED-WATER FILTER:



Grease Extracting Feed-Water Filter

This device makes it impossible for oil to get into the boiler, thus preventing dangerous bagging plates and oil caked tubes. Keeps heating surfaces clean, increases steaming capacity and lowers coal bills.

Filtering surface is equal to many times the area of feed-water pipes. Has device for applying a reverse steam current for temporary cleaning.

Renewals are easy to make. Every part is easy to clean. Maintenance cost is practically nothing.

Catalog on request.

AMERICAN RELIEF VALVES:

Iron Body Brass Mounted



Approved Underwriter



Standard

Digitized by Google

AMER. STEAM GAUGE & VALVE MFG. CO. BOSTON, MASS.

AMERICAN RELIEF VALVES :

All Brass



For Small Pumps



For Tanks, etc.

AMERICAN MODEL E POP SAFETY VALVE:



The American is very simple in construction and has fewer working parts than other valves.

All adjustments can be made from the outside without taking valve apart. Bushings never leak.

Every valve is guaranteed to open promptly at the pressure stamped thereon and to close just as promptly with a minimum loss of steam.

Before leaving our factory, every valve is tested under actual working steam pressure.

Catalog No. 70 sent on request.

AMERICAN GAUGES:



Bourdon Gauge

All parts subject to wear are of rugged construction and made of especially hard, wear-defying metal. The segment and pinion have unusually wide face to reduce wear.

Each dial is *individually hand-calibrated*, insuring absolute accuracy.

Catalog No. 70 sent on request.

AMERICAN RECORDING GAUGES: 201



Recording Gauge

Have the very highest grade dust-proof clock movement made, insuring accurate records.

The fountain pen used will not leak and holds sufficient ink to last one month.

Throughout, the materials used have been selected with the idea of giving long wear.

The standard chart is 8″, for a 24-hour record, but special charts can be furnished.

Catalog No. 70 sent on request.

Our seventy years' record is behind our guarantee covering all goods which we manufacture.

Digitized by Google

CROSBY STEAM GAGE & VALVE CO.

EXECUTIVE OFFICES

40 CENTRAL ST., BOSTON, MASS.

STORES: BOSTON, 38 Central Street — NEW YORK, 100 Walker St.
CHICAGO, 180 No. Market Street — SAN FRANCISCO, 121 Second St.
LONDON, ENG., 147 Queen Victoria St.

Manufacturers of Standard Steam Appliances

STANDARD SAFETY VALVES:
Stationary and Marine



Standard Valve

Conforms to the
A. S. M. E. Boiler Code
also
Federal and State Laws
Efficient Durable Economical
High Discharge Capacity

CROSBY GLOBE AND ANGLE VALVES



Globe Valve

Made in **Brass,** Iron and Steel in Various Types and Sizes, Screwed and Flanged.

The Spring Seat:

A Most Important Feature, Closes Tight—Remains Tight.
Seat not easily abraded.
Nickel or *Monel Seats* where required.

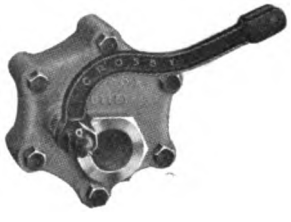
SAFETY RELIEF VALVES:
for
Steam, Air and Water



Relief Valve

Made of Gun Metal
A Perfect Automatic Valve
Strong and Efficient
As a Water Relief Valve it has an exceedingly large discharge.

JOHNSTONE IMPROVED BLOW-OFF VALVE:



Blow-off Valve

Swing Lever Type:
Stationary
Marine
Locomotive
Heavy and Durable Construction.
Few Parts.
Maintenance Negligible.
All Parts Renewable.

(See page 288 for additional products of this Company)

Digitized by Google

J. E. LONERGAN CO.

211–215 RACE ST., PHILADELPHIA, PA.

Manufacturers of Boiler, Steam and Gas Engine Specialties

TRADE Lonergan MARK

POP SAFETY VALVES:

Were first made under Lynde Patents issued in the year 1872, and have since been improved upon by our corps of capable engineers of long experience who with their combined skill have brought the LONERGAN POP SAFETY VALVE up to its present state of excellence.

Points of Superiority:

1. Does perfect work while in service.
2. Repairs practically nothing.
3. Has long life.
4. Always seats perfectly.
5. *Great relieving capacity* as it is the only valve on the market having an expansion chamber above the seat, with baffle plate over that, so as to get the benefit as the steam lifts the valve off its seat, of both the compressed and *expanded* steam, which construction gives the valve a high lift.
6. *Adjustable screw ring*, very easy to regulate—used to govern number of pounds steam relieved before valve closes.
7. Springs of the best grade PENNSYLVANIA ANALYSIS OPEN HEARTH STEEL, of a fibre stress suited for best results.
8. All valves made with bevel seats, except when otherwise ordered.

"Protected Spring" Pop Safety Valve Model "B:"

For Water Tube Boilers, etc.
Encased Spring to protect it from contact with live steam.
Lonergan Patent Double Eccentric Lifting Gear, the best lifting device made.
Good for working pressure up to 300 lbs.
Testing yokes furnished at small extra charge.
Fitted for LOCK to prevent their being tampered with.
Recommended for use in Power Stations, Electric Light Plants, Large Manufacturing Plants.
Sizes 2″, 2½″, 3″, 3½″, 4″, 4½″, 5″ and 6″, Iron Body Bronze Mounted, with either bronze or nickel seats.



Model "B"

"Marine" Pop Safety Valve Model "D:"

For use on Marine Boilers.
General Specifications same as Model "B."
Handle on top allows valve to be turned on its seat when under steam pressure.
Repairs easily made as valve can be broken below outlet, for seat repairs.
Complies with rules of:
United States Board of Supervising Inspectors of Steam Vessels.
Board of Trade, Great Britain.
British Lloyds.
Bureau of Veritas, France.
Sizes 2″, 2½″, 3″, 3½″, 4″, 4½″, 5″ and 6″, Iron Body Bronze Mounted.



Model "D"

DUPLEX POP SAFETY VALVE (MODEL "F"):

Two valves in one base casting. Furnished with outlet at either end, or in center. Made in Bronze, Steel, Semi-Steel and Iron. Equipped with Rocker-shaft Lifting Gear so valves can be lifted in succession or simultaneously. Used largely by U. S. Government, Merchant Marine, etc.

WATER RELIEF VALVES:

Good for working pressures up to 300 lbs. Recommended for use on Pumps, Hydraulic Elevators, Pipe Lines, Water Works, etc. Relieving capacity unequaled by any other make of valve on the market.

CHIME WHISTLES:

Made in two types, MODEL "WV," adjustable Lever with valve. MODEL "WN," without valve. Bell diameter sizes from 1½″ to 12″. Bells of solid cast bronze and not built up with a web inside of a lap-welded tube. Recommended for Marine and Stationary Work, Fire Alarms, etc.

We also manufacture Cylinder Relief Valves, Plain Whistles, Quick Closing Water Gauges, Automatic Closing Water Gauges, Chain Pull Gauge Cocks, Oil Cups, Grease Cups, Jelco G. G. Cutters.

(See page 289 for additional products of this Company)

Digitized by Google

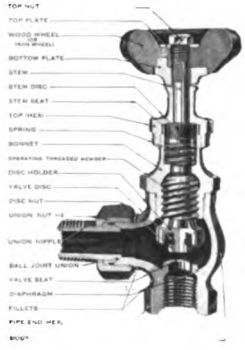
PIERCE, BUTLER & PIERCE MFG. CORP.

VALVE AND GAUGE DIVISION

GENERAL AND SALES OFFICES
437 EAST 162ND STREET
NEW YORK CITY

FACTORY
282 JAMES STREET
SYRACUSE, N. Y.

THE PIERCE PACKLESS VALVE (Patented):



Cut-open view

(For high pressure and low pressure use).

Developed in manufacture since 1911—the first packless valve on the market. The most simple and efficient in design.

204

Effects these savings:

1. Labor in periodical or seasonal re-packing.
2. Labor in repeated adjustment of a packing-nut.
3. Packing material.
4. Idleness of lines and equipment tied up by leakage and re-packing.
5. Money losses which go with wasted steam or other content of the line.
6. Damage incident upon escape of steam, water, etc.

Pays not only the difference in its cost over the cheapest valve, but its entire cost, in savings over a fraction of its life.

A superior valve from the standpoint of quality alone—exceptional in strength, efficient in design, machined under gauge limits and inspection and according to approved practice. Fitted with genuine Jenkins Bros. valve-discs.

Prices are uniform with those of high grade standard valves.

Send for Catalog.

THE PIERCE GAUGE:

An instrument not excelled by any gauge manufactured.

Construction:

1. Independent Movement—mounted independently of the case—not susceptible to throwing out of accurate adjustment.
2. Phosphor Bronze and German Silver Movement Combination—the most durable that can be used.
3. Wide Sector Face—at the first wearing point.



Transparent-front view

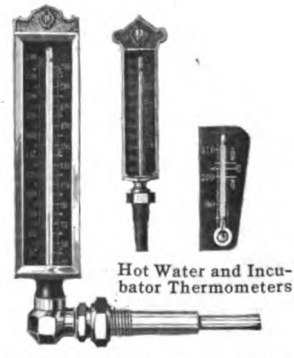
Gauges of this kind are an economy. They last as long as several of the cheaper type.

Prices are uniform with those of the majority of well established manufacturers.

Pressure gauges of all kinds and sizes.

Send for Catalog.

PIERCE THERMOMETERS:



Hot Water and Incubator Thermometers

"V"-Type Industrial Thermometers

Specialties:

Industrial (V-type)
Hot-water
Incubator

Each scale is engraved in exact relation to the registration of the tube used with it.

Mercury or colored fluid—the colored fluid with absolute guarantee against fading.

These are instruments unexcelled in accuracy, substantial execution, and finish.

Our engineers (each of over thirty years experience in the design and manufacture of instruments in his line), develop new designs in VALVES, GAUGES and THERMOMETERS, to meet special problems leading to quantity manufacture.

Digitized by Google

A. W. CASH COMPANY

DECATUR, ILL.

Manufacturers of Pressure Reducing and Regulating Valves, Pump Governors, Fan Engine Regulators, Relief Valves, Strainers, Ammonia Expansion Valves and Oxygen-Acetylene Regulators

CASH STANDARD PRESSURE REDUCING AND REGULATING VALVES:

The Cash Standard Line Covers the Field of Pressure Reducing and Regulating Valves Completely:

Class D.—Single and Double Seat, for Hot Water, Cold Water, Steam, Air, Oil and Various Gases.

Class H.—Auxiliary Type, for Steam, Water and Air.

Class G.—Outside Auxiliary Control, for Power and Heating Service; Back Pressure Valves; Emergency Stop Valves; Automatic Cut-Off Valves; Heavy Type Relief Valves; Special Relief Valves; Exhaust Relief Valves; Pressure and Vacuum Relief Valves; Ammonia Expansion Valves; Ammonia-Controlled Water Regulators; Fan Engine Regulators; Pump Governors; Oxygen Regulators; Acetylene Regulators; Water Type Strainers; Steam Type Strainers.



Class D.—For Steam, Air, Oil, Hot Water, Cold Water, Ammonia and various other gases. Accurate, dependable reduction and regulation.

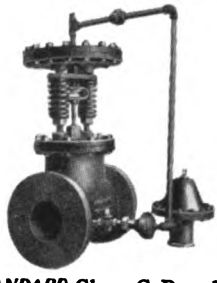
All working parts quickly removable. Effective self contained strainer. For all pressures—air service as high as 3000 lbs. Made in iron and bronze bodies. Single and double seat. In sizes ½" to 4".

All iron body valves electro-galvanized.

Valves for Superheat steam service with monel metal parts a specialty.



CASH STANDARD Strainers for Water, Steam, Oil and various gases (shown opposite). Rigid construction. The above type good for 300 lbs. working pressure. Extra large sediment chamber. Has standard pipe cleanout plug; cock can be installed for pipe to drain and blow out frequently. Iron Body—Bronze Screen, Screw End type, ½" to 2"; Flange End, 2" to 10". All electro-galvanized.



CASH STANDARD Class G Regulators with Outside Auxiliary Control for both Power and Heating Service, for both high and low pressure water or steam, where initial pressure is constant or variable, or where there are large variations in volume or delivery pressure.

Stock valves regulate very close and accurately. Special valves of this type can be made to control within one inch water column. Iron Bodies, Standard and Extra Heavy. Sizes 2" to 10".



CASH STANDARD Pump Governors. Very sensitive. Controlled by variation in discharge pressure from pump. No leakage. No wearing of grooves in cylinder by cup packing. Effective self-contained strainer. All parts quickly removable. Iron and bronze bodies. Sizes ⅜" to 3".

An extensive 32-page catalog has just been printed. It contains information valuable to all valve users. Write for your copy.

Digitized by Google

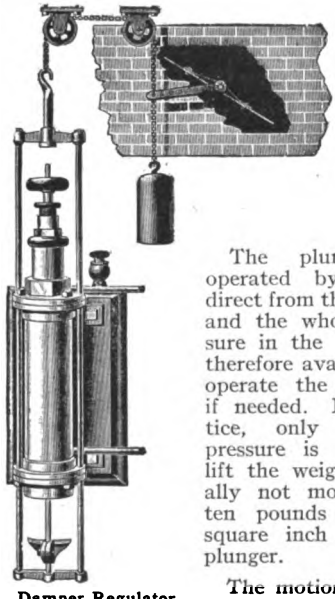
JULIAN D'ESTE COMPANY

26 CANAL ST., BOSTON, MASS.

Brass Founders, Finishers and Machinists
Sole Manufacturers of Curtis Engineering Specialties

Manufacturers of Damper Regulators, Hydraulic Damper Regulators, Improved Pressure Regulators, Improved Pump Regulators, Water Pressure Regulators, Expansion Trap, Return Steam Trap, Balanced Steam Trap, Balanced Valves, Relief Valve for Steam and Water, Steam Separator, Temperature Regulator, Pump Governor and Pump, Blower Valve, Improved Bucket Trap, U. S. Ball Cock, Etc.

THE CURTIS IMPROVED DAMPER REGULATOR:



Damper Regulator

The plunger is operated by steam direct from the boiler, and the whole pressure in the boiler is therefore available to operate the damper if needed. In practice, only enough pressure is used to lift the weight, usually not more than ten pounds to the square inch on the plunger.

The motion of the damper will begin to change from one direction to the other on a minimum variation of steam pressure.

We guarantee a saving of ten per cent of the fuel over the best hand regulation, and it often reaches fifteen per cent.

They are sent on thirty days' approval and will pay their cost by the saving of fuel in one year. Three standard sizes, 1, 2 and 3.

IMPROVED STEAM PRESSURE REGULATORS:

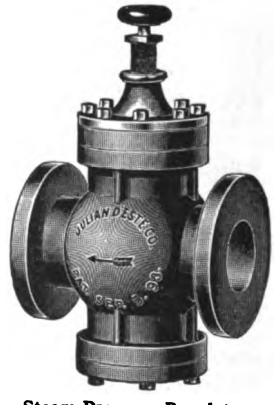
This regulator is made entirely of metal; occupies the same space as a globe valve for the same size pipe; is a lock valve and is very simple and sensitive. Each size is made to a standard gauge; any injured piece can be replaced at a moment's notice.

For universal applications to all the varied and various conditions under which a reduced pressure of steam is required, this regulator has no equal. It is compact and self-contained, without levers, weights or projections.

This regulator is suitable for boiler pressure up to 250 pounds and will deliver accurately and uniformly any lower pressure from one to within a few pounds of the initial pressure.

In the best engineering practice the exhaust steam of the engine and elevator is turned into the heating system of a building, and the regulator automatically supplies just the amount lacking to maintain constant pressure in the pipes and radiators.

It has no glands or packing; no drip or leak of steam or water. All that passes into it passes through it without waste or loss.



Steam Pressure Regulator

It is used on steam heating apparatus, slashers, jacket kettles, air and water pumps; on steamships for deck machinery, pumps supplying steam to engines at lower than boiler pressure, or in any place where it is desired to reduce from a high pressure to a lower pressure. In pulp and paper mills, on digestors and on the dryers, it is highly recommended and can

Digitized by Google

be used in connection with exhaust steam, and we can guarantee perfect work and scientific drying of all grades of materials.

Standard sizes for ½", ¾", 1", 1¼", 1½" screwed-all bronze; 2" screwed cast iron body, bronze mountings; 2½", 3", 4", 5", 6", 7", 8", 10" and 12" cast iron body, bronze mountings, extra heavy standard flanges.

A lockup top furnished at small additional cost.

CURTIS WATER PRESSURE REGULATOR:

For Pulp and Paper Mills, Hotels, Public Buildings and Dwelling Houses:

EVERY REGULATOR IS WARRANTED to maintain the pressure desired, with perfect uniformity, regardless of any and all fluctuations in the outside pressure.



Curtis Water Pressure Regulator

Every movable part of the regulator which comes in contact with the water (except the diaphragm) is made of the best composition, so that trouble with rust or clogging with sediment is entirely avoided. The material and workmanship cannot be excelled, our aim being to produce a machine unapproachable in point of excellence, in all its and practically imperishable working parts, at the lowest price consistent with such quality and excellence.

This regulator is guaranteed to deliver water into service pipes at any desired pressure, and, however the outside pressure may fluctuate, will deliver uniformly and permanently at the point at which it is set.

Pressure reduced to the point found to be sufficient for domestic purposes prevents flying and spattering, and consequent waste of water; obviates the wear and tear by water-hammer or concussion in pipes, and thereby greatly reduces the cost of keeping the plumbing in order.

Made for ¾", 1", 1¼", 1½", 2" and 2½" pipe, screwed.

Made for 3", 4", 5", 6", 7" and 8" pipe, flanged.

THE CURTIS BALANCED STEAM TRAP:

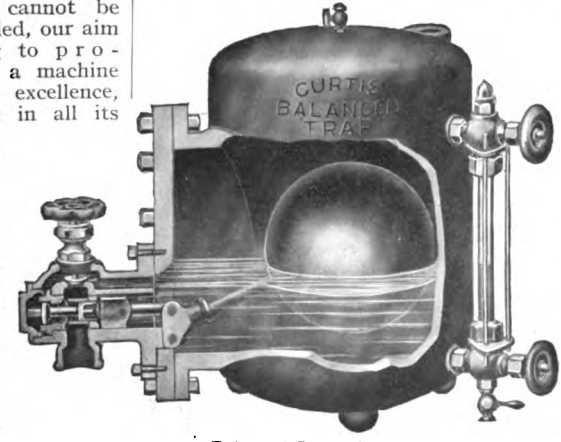
Some Points of Superiority

1. A perfectly balanced valve.
2. An absolutely frictionless valve.
3. The valve can be removed without breaking a joint, starting a gasket, or taking out a bolt.
4. The valve being frictionless and balanced, the whole power of the float is available for opening and closing it.
5. The copper float is perfectly spherical, as hermetically sealed as a glass globe, is of uniform thickness and warranted strong and tight at 250 lbs. pressure.
6. It has a by-pass valve to insure constant operation.
7. Each trap will operate perfectly on pressures varying from one to 250 pounds.

PRICE LIST

Size and Condensing Capacity in Feet of One-Inch Pipe

No. 000,	for 1,000 ft.	½	in. inlet and outlet
No. 00,	for 2,000 ft.	½	in. inlet and outlet
No. 0,	for 3,000 ft.	½	in. inlet and outlet
No. 1,	for 5,000 ft.	¾	in. inlet and outlet
No. 2,	for 8,000 ft.	1	in. inlet and outlet
No. 2½,	for 15,000 ft.	1¼	in. inlet and outlet
No. 3,	for 30,000 ft.	1½	in. inlet and outlet
No. 4,	for 40,000 ft.	2	in. inlet and outlet
No. 5,	for 60,000 ft.	3	in. inlet and outlet
No. 6,	for 95,000 ft.	4	in. inlet and outlet



Balanced Steam Trap

Digitized by Google

THE FISHER GOVERNOR COMPANY

MARSHALLTOWN, IOWA

Manufacturer of Pump Governors, Reducing Valves, Back Pressure and Exhaust Relief Valves, Balanced Lever and Float Valves, Boiler Compound Feeders, Air Traps, Steam Traps, Oil Field Specialties

FISHER STEAM SPECIALTIES are the products of untiring research, the use of best materials for the purpose and conscientious, careful workmanship. The finish of Fisher products is carried beyond the "good enough" stage not only because a high finish makes an attractive appearance, but because it makes the apparatus more sensitive. When two or more metals are suited to the requirements, but one is a trifle better than the others, we choose the best. That is the policy in all Fisher work.

The United States Government specifies "Fisher or equal." Our products reflect our pride in that confidence.



FISHER PUMP GOVERNOR:

There is a Fisher for every service, pressure and vacuum, power plant and marine, in several types. They are made screwed or flanged, angle or globe; made in sizes from ¼" to 12", each type varying in its range of size to meet the required service.

No matter what your pump handles—plain water, brine, ammonia, acid or alkali—we can supply a Fisher governor.

FISHER REDUCING VALVES:

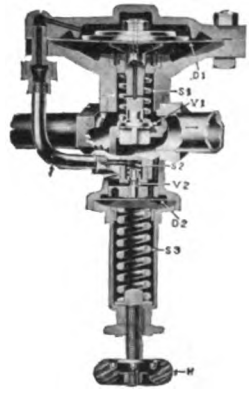
For a very sensitive, quick acting, reducing valve for either steam, air, water, gas or oil service specify "Fisher."



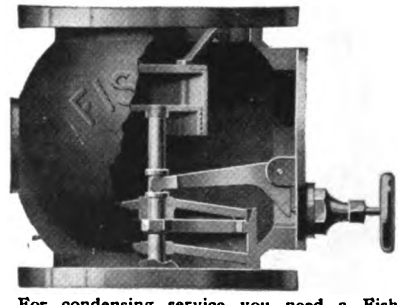
They will not stick, chatter or hammer; made in several types and sizes ranging from ¼" to 24".

FISHER SERIES 90 REGULATOR:

This regulator is offered for installations in which a compact, self-contained valve is desired. It will maintain the desired low pressure regardless of fluctuation of high pressure. For air lines and dead end steam service, it is not excelled.

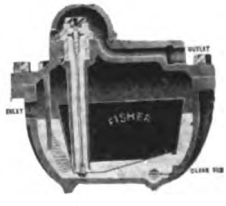


EXHAUST RELIEF VALVE:



For condensing service you need a Fisher exhaust relief valve to protect your engine or turbine. They are positive in action—operate without noise. They automatically open if the vacuum is lost, permitting engine to exhaust to atmosphere. When the vacuum is restored they automatically close; made in horizontal and vertical types—sizes 6" to 36".

FISHER STEAM TRAP—TYPE 33:



If you need a steam trap, you need a Fisher trap. Their action is positive; constructed of the best materials with only two wearing parts, valve and seat, made of Monel Metal—practically incorrodible. Bucket is a gray iron casting whose walls are but as thick as cardboard, as light as pressed steel, but will outlast several steel buckets. The trap will not blow steam; it is water sealed. Made in sizes of ½" to 3" to discharge 1000 to 14,000 lbs. of water per hour.

Send for bulletins and catalogues.

Digitized by Google

FOSTER ENGINEERING CO.

NEWARK, N. J.

BRANCH OFFICES: CHICAGO, PHILADELPHIA, BOSTON, CLEVELAND

Manufacturing Engineers of Automatic Valve Specialties

PRODUCTS: PRESSURE REGULATORS (Reducing Valves), PUMP GOVERNORS (different styles for different purposes), for steam, water, gas and air. HYDRAULIC REGULATING and RELIEF VALVES, for high and low pressures. Automatic FREE EXHAUST or RELIEF VALVES; BACK PRESSURE VALVES; FAN ENGINE REGULATORS, for controlling speed of fan by pressure in boiler. LEVER BALANCED VALVES; FLOAT VALVES, auxiliary-operated and direct-acting. AUTOMATIC NON-RETURN STOP VALVES; AUTOMATIC NON-RETURN EMERGENCY STOP VALVES, for saturated and superheated steam—semi-steel and cast-steel bodies, and other kindred devices. Over 60 different styles. Also design valves for special services.

FOSTER CLASS "G" PRESSURE REGULATING VALVE:

FOR *INTERMITTENT* SERVICE

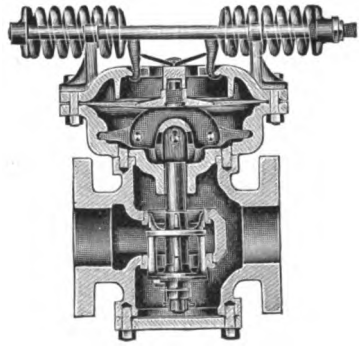


Suitable for initial working pressures as high as 300 pounds. Heavily constructed, rugged and is suitable for severe and exacting requirements. When full conditions are placed before us, this valve is guaranteed to meet requirements and will not pound, chatter, bind or stick. It may be installed in any position—upright, inverted or inclined at an angle. Sizes ½" to 2", composition mounted—2½" to 12" inclusive, iron body, bronze mounted, regular construction. Also, furnished in steel, on order.

CLASS "W" FOSTER PRESSURE REGULATOR:

FOR *CONSTANT* SERVICE

Its "compensating spring and toggle lever arrangement" makes it phenomenally sensitive, accurate and reliable. Has no weights, levers, or close-fitting piston or parts to cause friction. Very simple in construction and adjustment. Made in sizes ¼-inch to 1-inch of composition, larger sizes, iron body, composition mounted. Sizes 2½-inch and up are fitted with *renewable seats*, forged steel stem and levers—insuring **durability** and **minimum repairs.** Thousands are in use today in all civilized countries and is the "standard" of many large power and manufacturing plants.



ORDERS FOR PRESSURE REGULATING VALVES SHOULD SPECIFY:

1. Initial or boiler pressure.
2. Maximum and minimum delivery pressure.
3. Connections—screwed or flanged ends, giving diameter.
4. Sizes of both pipes leading to and from regulator.
5. Device or system to which it is to be applied.
6. For high or low pressure service.
7. Size of valve preferred and if we will be permitted to send a smaller size if we deem a smaller valve will give better results. By following our suggestions we often save considerable money for our users.
8. Any additional information towards an intelligent understanding of your requirements will insure your receiving a valve best suited to meet conditions.

Digitized by Google

ILLINOIS ENGINEERING COMPANY

GENERAL OFFICE AND FACTORY: CHICAGO

Manufacturers of Automatic Steam Power Specialties, Pressure Reducing Valves, Back Pressure Valves, Atmospheric Relief Valves, Non-Return Stop and Check Valves, Steam Traps, Oil and Steam Separators, all types, Cast Iron Exhaust Heads, Balanced Valves, Pump Governors, Etc.

Branches and Representatives

CANADIAN OFFICE: TORONTO, 111 KING STREET, EAST

ATLANTA, 258 Candler Annex
BALTIMORE, Builders' Exchange
BOSTON, 141 Milk Street
BUFFALO, 756 Washington Street
CLEVELAND, 412 Century Bldg.
DALLAS, 207 Gaston Bldg.
DETROIT, 1772 La Fayette Blvd.
HARRISBURG, 214 North Third St.
INDIANAPOLIS, 1224 State Life Bldg.
KANSAS CITY, 410 E. 43rd St.
LOS ANGELES, 1101 Baker-Detwiler Bldg.
MILWAUKEE, 342 Fourth St.
MINNEAPOLIS, 804 Metropolitan Life
NEW YORK, 838 Singer Bldg.
OMAHA, 728 World-Herald Bldg.
PHILADELPHIA, The Bourse
PORTLAND, 68 N. Twelfth St.
RICHMOND, 382 E. Main St.
ROCHESTER, 404 Cox Bldg.
ST. LOUIS, 1308 Olive St.
SAN FRANCISCO, 559 Pacific Bldg.

ILLINOIS STEAM HEATING SYSTEMS:

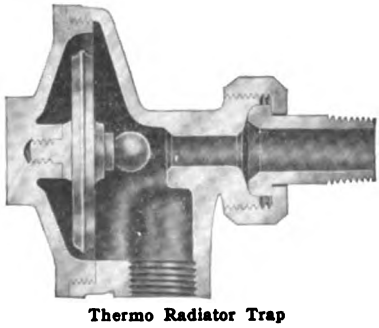
VACUUM—VAPOR—MODULATING

Illinois Heating Systems are the highest development of modern heating, and are the result of over two decades of specialized work in the heating field.

Illinois Systems are successfully installed in thousands of buildings from Coast to Coast.

210

We manufacture a full line of Vacuum and Vapor Specialties, and all necessary accessories, such as Vacuum Pump Governors, Suction Strainers, Air Liberating Tanks, Vent Seal Valves, Expansion Joints, etc., also Steam Specialties, and maintain an efficient Engineering Department to assist Architects and Engineers in the proper installation of our devices.



Thermo Radiator Trap

All Illinois Systems, whether Vacuum or Vapor, use our Thermo Trap on all radiators. This Trap has many exclusive advantages as will be seen in cut of same. It is the original Vertical Seat Trap, thus avoiding trouble from stoppage by dirt.

The diaphragm is carefully made of 90,000 lbs. tensile strength Phosphor Bronze and the durability of these is such that, under our three-year guarantee, the number of renewals is practically nil.

The Thermo Trap is sensitive and positive in operation. It is made in four sizes with a range in capacities from 50 sq. ft. to 1500 sq. ft. of radiation.



Supply Valve

The Illinois Modulating Supply Valve controls supply of steam to the radiator by only a half turn of the handle from closed position to full open. This gives ready and easy control of the temperature of the room.

Write for Bulletin No. 10 and Bulletin No. 20 for detail data concerning these specialties.

Write for 88 page Catalog descriptive of Illinois Heating Systems.

Digitized by Google

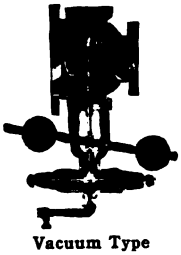
ILLINOIS ENGINEERING COMPANY CHICAGO

Eclipse

We manufacture the **Eclipse Steam Specialties** established by John Davis Co. Many of these devices have been on the market for 35 years, and many of the standard steam specialties in general use found their origin in the pioneer Eclipse line.

PRESSURE REDUCING VALVES:

For all pressures and services, the cumulative experience of 35 years has perfected these valves.



Vacuum Type Reducing Valve

The Eclipse Vacuum Type Reducing Valve will regulate and hold the reduced pressure within a 4-oz. limit. Will reduce from an initial pressure as high as 150 lbs. to any reduced pressure from 10 lbs. to ¼ lb. This valve is ideal for use in Vacuum Heating Systems, where a constant low pressure is desired, and it is used on thousands of important buildings.

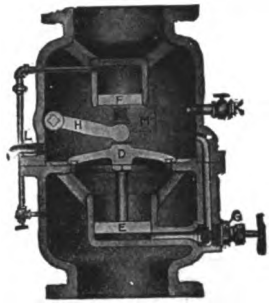
The Eclipse Adjustable Piston automatically compensates for variations in pressure insuring tight closing, and is exclusive to Eclipse Valves.

BACK PRESSURE VALVES:

Of all types.

Combination Atmospheric Relief and Back Pressure Valves (see cut) for plants operating both condensing and non-condensing, or wherever precise regulation of back pressure is desired. Built under Hockfeldt Patents.

Atmospheric Relief Valves for safeguarding engines and turbines run condensing.



Combination Atmospheric Relief and Back Pressure Valve

Balanced, Bevel-Seated Valves, both spring controlled or lever and weight controlled.

NON-RETURN VALVES:



Non-Return Valve

Eclipse Stop and Check Valves have several exclusive points of merit. They are of heavy construction for 250 lbs. working pressure, the large internal dash pot is independent of the body, the piston is reinforced with 4 ribs —not a plain rod as usual, and the valve can be packed while in service under pressure. They do not stick or chatter. Also built with steel bodies and monel parts for Superheated Steam.

Write for Bulletins covering the above valves and other Eclipse Steam Specialties.

Pressure Regulating Valves, Bulletin 101
Back Pressure Valves, Bulletin 201
Steam Traps, Bulletin 301
Non-Return Valves, Bulletin 451
Extra Heavy Globe and Angle Valves, Bulletin 451
Steam and Oil Separators, Bulletin 501
Pump Governors, Boiler Trimmings, Bulletin 701

Representatives in 21 principal cities.

SEE OUR ADVT. IN MECHANICAL ENGINEERING THE JOURNAL OF THE A.S.M.E.

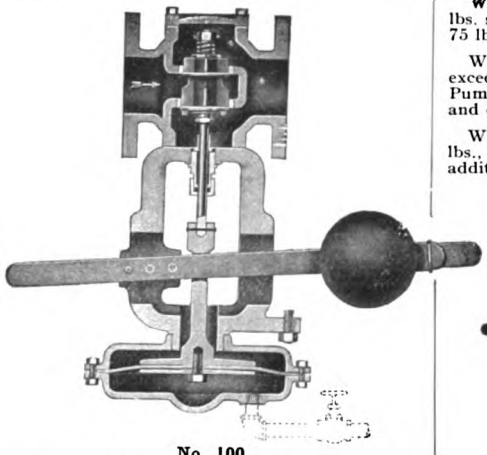
Digitized by Google

KIELEY AND MUELLER, INC.

34 WEST 13TH ST., NEW YORK CITY

Manufacturers of a Complete Line of High Grade Steam, Water and Air Specialties for Modern Heating, Power and Plumbing Installations

KIELEY SPECIAL '98 REDUCING VALVE:



No. 100

SERVICE—The independent diaphragm feature of the Special '98 Valves makes them very desirable for use in connection with vacuum or vapor heating systems, or any other service where close regulation is of importance. They are not, however, suitable for reducing pressures against a dead end. For such service use our Single Seated Reducing Valves.

REGULATION—The Special '98 Regulating Valves, both straight and differential patterns, are especially designed to meet the most exacting requirements in promptly responding to the slightest fluctuation in the reduced pressure.

Should a given pressure be desired at any point of the heating system or supply mains it can be had and maintained within a fraction of a pound of what is required, by adjusting the weight on the lever and by extending the ½" pipe, which connects to the bottom of the diaphragm, to the point at which the pressure is desired.

WORKING PRESSURES:

Standard Weight—Initial pressure 125 lbs. or less. Delivery or reduced pressure 0 to 10 lbs.

Extra Heavy—Initial pressure 150 lbs. or less. Delivery or reduced pressure 0 to 10 lbs.

KIELEY POSITIVE ACTING PUMP GOVERNOR:

Service—For automatically controlling speed of pumps and maintaining water lines in heating systems, receiving tanks, feed water heaters, etc.

This device can be placed at any height above the pump suction and, when properly connected, will automatically control water lines or the speed of condensation or boiler feed pumps or both.

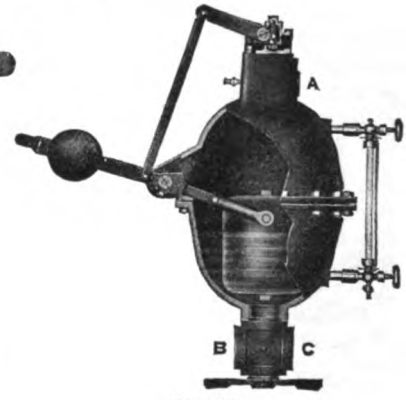
The cast iron floats are indestructible, and all moving parts, with the exception of the floats, are on the outside, where they can be reached readily for adjustment and repairs. Bodies are cast iron and steam valves are constructed of Government Bronze.

"A"—Inlet or equalizing pipe. "B" and "C"—Inlet or suction.

WORKING PRESSURES—Suitable for 150 lbs. steam pressure from boiler to pump, and for 75 lbs. pressure on the returns.

Where the steam pressure from boiler to pump exceeds 150 lbs., we supply a steam valve for Pump Governor fitted with monel metal seats and discs at a slight additional cost.

Where the pressure on the returns exceeds 75 lbs., we furnish our Extra Heavy pattern at additional cost.



No. 334

OTHER PRODUCTS:

Reducing Valves for steam, water, air, etc.
Back Pressure Valves for all purposes.
Atmospheric Relief Valves for all purposes.
Steam Traps for all purposes.
Damper Regulators of various kinds.
Hot Water Temperature Controllers.
Steam and Water Separators.
Oil and Grease Extractors.
Pump Regulators.
Water Pressure Regulators.
Water Feeders.
Return Steam Traps.
Feed Water Regulators.
Grease and Oil Traps.
Emergency Valves.
High and Low Water Alarms.
Strainer Connections of various kinds.
Drip Tank Controllers.
Float Valves.
Tank Pump Controllers.
Pump Governors and Receivers.
Combination Muffler and Grease Extractor Tank, Receiver, Pump Governor, Pump and Feed Water Heater.
Grease Extractor and Purifier.

SEE OUR ADVTS. IN MECHANICAL ENGINEERING THE JOURNAL OF THE A.S.M.E.

NOTICE—Trade Mark "KIELEY" appears on all our specialties, and they are known by that name. Kindly order or specify accordingly.

NEW COMPLETE CATALOGUE SENT ON REQUEST.

Digitized by Google

THE LESLIE COMPANY

FOUNDERS AND MANUFACTURERS

LYNDHURST, N. J.

PACIFIC COAST AGENTS: CHAS. C. MOORE & CO., ENGINEERS, SAN FRANCISCO, CAL.

LESLIE Pressure Regulators or Reducing Valves for Steam or Air

LESLIE PRESSURE REGULATORS:
Class "E"
For Marine and Stationary Service; suitable for Superheated Steam.
Class "F"
For General Service in Saturated Steam.
Class "H"
For Steam Heat and Other Low Pressure Stationary Services.
ALL LESLIE Pressure Regulators, when adjusted, work AUTOMATICALLY.

Class "E"

Made of High Pressure Steam Bronze throughout, in standard sizes from ½ to 20 inches, inclusive, is especially designed to deliver any desired pressure from a minimum of about 10 lbs. to a maximum of 85% of the initial or boiler pressure and to operate under any working steam pressure up to 350 lbs., in all kinds of service, both Marine and Stationary, for Steam (saturated or superheated), Compressed Air and Oil under pressure to Burners, Journal Bearings, etc.

Our Class "E" Regulators have met the most exacting and searching tests demanded by the United States and Foreign Navies, up to 350 lbs. working steam pressure. In service, where all other makes had failed, they have proved so successful that they are specified by the leading Naval Architects, Marine Engineers and Mechanical Engineers, as well as the largest users of Reducing Valves in the world, who not only specify them, but insist upon "Leslie" Valves being installed.

Class "F"

Has Main Body, Top and Bottom Caps of special high grade iron, with high pressure steam bronze fittings throughout, is made in standard sizes



from 4 to 20 inches, inclusive, will deliver any desired pressure from a minimum of about 10 lbs. to a maximum of 85% of the initial or boiler pressure, and is suitable for any working steam pressure up to 225 lbs. in saturated steam service.

The Class "F" Regulator meets the growing demand for a *reliable* Reducing Valve at reduced cost, where superheated steam is not used. This type of Regulator can be found in the largest and most important Power and Steam Plants, Mills, Manufacturing and Mining Plants in this and foreign countries and nothing could be more satisfactory than the results obtained.

Class "H"

In standard sizes from ¾" to 5", inclusive, made of highest grade steam bronze throughout; from 6" to 10", inclusive, has Main Body, Top and Bottom Caps of special high grade iron, with bronze fittings throughout; the Class "H" Regulator will deliver a reduced pressure of from about 5 lbs. to 20 lbs. and is designed for Steam Heat in buildings and other low pressure stationary services.

All LESLIE Pressure Regulators are made only of highest grade materials, and are manufactured exclusively by The Leslie Company.

Digitized by Google

MASON REGULATOR CO.

BOSTON, MASS.

Manufacturers of Regulating Appliances

REDUCING VALVES:

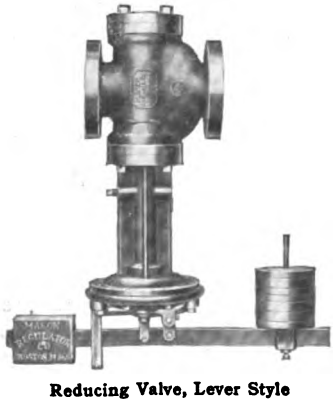
Reduce and maintain an even pressure of steam or air regardless of the variation of the initial pressure or of the volume of steam or air required. Automatically reduce boiler pressure for steam heating systems of all types (vacuum systems



Standard Reducing Valve

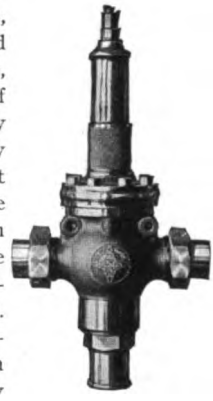
included), central heating plants, engines, paper machines, slashers, dye kettles and all situations where it is desirable to use a lower pressure than that on the boiler.

Furnished in the auxiliary operated, lever and weight, and other types. All-bronze for initial pressures of 300 lbs., and iron body for pressures up to 180 lbs.



Reducing Valve, Lever Style

STEAM PUMP PRESSURE REGULATORS:



Key Style Steam Pump Pressure Regulator

Designed for fire, boiler feed, air and water works pumps, or any class of pumping machinery where it is necessary to maintain constant pressure. They are placed in the steam supply pipe to the pump, and connected by a ¼-in. pipe to the discharge system thereby exactly regulating the amount of steam to the requirements of the pump, and automatically maintaining a uniform discharge pressure regardless of any variation of steam pressure or demand on the pump.

The key style regulator is provided with a dashpot, which positively prevents it from chattering or pounding when sudden changes occur in the discharge pressure. It is fitted with union connections threaded for standard wrought iron pipe. As regularly furnished, it is suitable for steam pressures up to 250 lbs. and discharge pressures between 20 and 140 lbs.

No. 126 regulator has been designed for closed systems, such as are used in supplying domestic service or larger pressure systems for office and factory buildings up to 150 lbs.

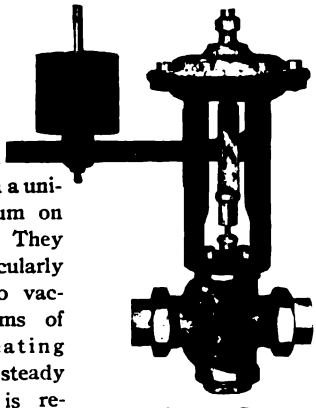


No. 126 Regulator

Digitized by Google

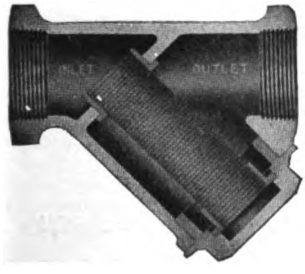
MASON REGULATOR CO. BOSTON, MASS.

STEAM VACUUM PUMP REGULATOR:



Steam Vacuum Pump Regulator

Designed to control steam operated vacuum pumps so as to maintain a uniform vacuum on the system. They are particularly adapted to vacuum systems of steam heating where a steady vacuum is required and an automatic pump control is desirable. The regulator consists of a balanced type of double seated valve connected to a diaphragm operating against the action of the weights, thereby regulating the steam supply to the pumps. Suitable for steam pressures up to 180 lbs. and adjustable for any desired vacuum.



Strainer
Sizes, ½ in. to 6 ins.

For use on steam or air lines to prevent sediment, scale, bits of packing or other foreign material passing into the reducing valve or other pressure regulator installed on the line, assuring the user of continuous service. Constructed not to reduce the volume of steam or air passing through them, yet are compact and self-cleaning without removing them from the line.

BALANCED AND FLOAT VALVES:

Used to control pumps, engines and the like, by means of tank floats or cords to distant points and also in connection with various devices for the control of water to receivers, open heaters and other



All-Bronze, with Yoke and Lever

similar devices. They are made in both the double seated or disk and piston type, with weight and lever or float attachment. Regularly furnished extra heavy, suitable for pressures up to 200 lbs.

HYDRAULIC DAMPER REGULATOR:



Hydraulic Damper Regulator

The design of the compensating device, which is positive in its action, insures the closest possible regulation. The operating cylinder as well as all parts coming in contact with the water are made from high pressure bronze and carefully machined to obtain the greatest durability and sensitive action of the apparatus. The knife edges and fulcrum points of the lever are also of special construction.

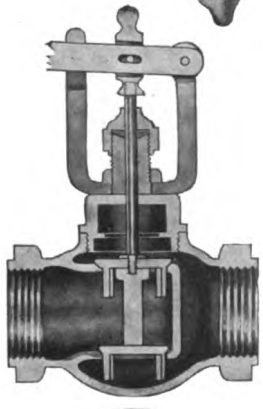
Suitable for controlling boiler pressure from 1 or 2 to 200 lbs. Piston is operated in both directions by water pressure, permitting use of rod connections to overhead shafting, which is desirable in the larger installations where a number of flue dampers are to be operated in unison.

Digitized by Google

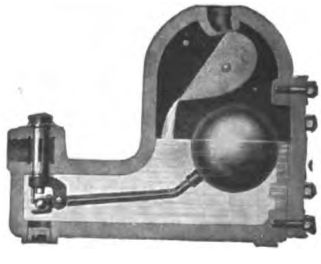
NASON MANUFACTURING COMPANY

71 FULTON STREET THRU TO 71 BEEKMAN STREET
NEW YORK, N. Y.









FOR EIGHTY YEARS
Leaders in
the Field of Engineering and
Sanitary Supplies and Specialties.

MANUFACTURERS OF:

Nason Steam Traps
Nason-Vesuvius Steam Traps
All Iron Liquid Ammonia Gauges
Nason Quick Closing Water Gauges
Aetna Gauge Cocks
Olympus Gauge Cocks
Immersed Valve Water Feeders
Steam and Gas Glue Heaters
High Pressure Radiators
Steam Tables
Balanced Valves, Etc.

Send for our Nason Specialty Bulletin which Describes These Devices in Detail.

We are also agents for, and carry a full stock of the products of the leading Staple and Specialty Manufacturers of the United States.

Digitized by Google

AMERICAN INJECTOR COMPANY

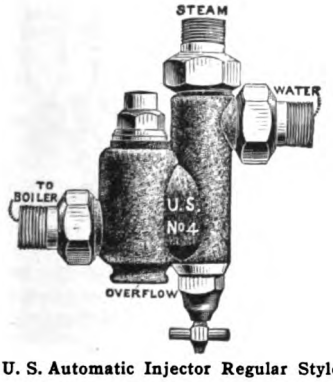
DETROIT, MICH.

Manufacturers of Injectors, Ejectors, Jet Pumps, Drive Well Jet Pumps, Fire Plugs, Grease Cups, Oil Cups, Oil Pumps, Water Gauges, Air Cocks, Gauge Cocks, Lubricating Devices and Other Steam Specialties

U. S. AUTOMATIC INJECTORS:

Have the following points of unquestionable superiority:

1. **Easy to Operate**
2. **Wide Range**
3. **Absolutely Automatic**
4. **Never "Break" through Jarring**
5. **Backed by an Absolute Guarantee**
6. **Every Injector Carefully Tested**



U. S. Automatic Injector Regular Style

The utmost care is taken to see that every U. S. Injector leaving the factory shall be perfect in every respect. Each injector is tested on different lifts and with various steam pressures. A card is attached to the Injector showing its range, and we guarantee every Injector to work as per attached card.

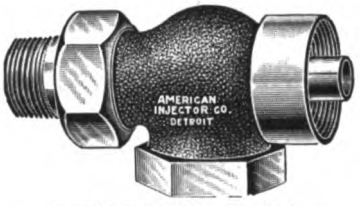
Other Distinctive Features are: 1 The drip-cock. 2. The construction of disk valve on delivery tube, which, being cup shaped, is forced to rise to its seat by the jets of water thrown against it from beneath. 3. The overflow valve, which never wears leaky.

Sizes range from ¼"–3" pipe connection, with corresponding capacities of 36 to 5800 lbs. per hour at 80 lbs. steam pressure and three foot lift, water 76 deg.

Special High Steam Injectors to work to 300 lbs. steam pressure can be furnished to order. Also, injectors with special connections.

AMERICAN EJECTORS (Model B):

The American Ejector, because of its internal construction, gives superior ser-



American Ejector—Model B

vice in raising water from deep wells, mines and pits or emptying tanks, raising and transferring liquids (hot or cold) in tanneries, dyehouses, etc., or for priming centrifugal pumps.

The jets are made of a special hard bronze and can be renewed when worn, as the body of the Ejector will last indefinitely.

GAS ENGINE "EXPLOSO" OIL CUP:



"Exploso" Oil Cup

"Exploso" Gas Engine Oil Cup is especially designed and manufactured for the class of trade demanding a Lubricator of the highest type. The filling arrangement consists of a sliding lid which makes the filling of the cup very simple and insures it being oil-tight. The sight feed opening is large and the shank is fitted with a large ball check valve to prevent back pressure entering the sight feed chamber.

With improved features an even, constant flow of oil to the cylinder is assured.

The rate of feed can be adjusted by the milled regulating screw and ratchet holding the same to place.

Catalogue No. 30, giving full details about U. S. Automatic Injectors and "The Engineers' Red Book," full of practical information for the Operating Engineer, ***will be promptly sent upon request.***

Digitized by Google

THE FULTON COMPANY

KNOXVILLE, TENNESSEE

Manufacturers of Sylphon Automatic Temperature Controlling Instruments

BRANCHES

NEW YORK
HUDSON TERMINAL BLDG.
50 Church St.

DETROIT
1247 Washington Blvd.

CHICAGO
WRIGLEY BLDG.
Michigan Boulevard

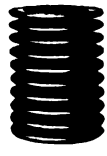
REPRESENTATIVES IN ALL PRINCIPAL CENTERS

PRODUCTS:

Sylphon

Patentees and manufacturers of Sylphon products. Sylphon Packless Radiator Valves; Sylphon Hazardous Liquid Packless Valves; Sylphon Standard Pressure Packless Valves; Sylphon Temperature and Pressure Regulators; Sylphon Air Line Valves and other Sylphon Heating Specialties.

ADVANTAGES:



All Sylphon devices embody the seamless, one-piece bellows of drawn metal shown at right. There is not a bit of solder throughout its length—no chance for leaks or breaks. It is a feature found exclusively in Sylphon Products.

NO. 930 and NO. 931 TEMPERATURE REGULATOR:

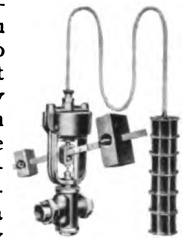


For nearly all requirements where liquids are heated by steam, and especially industrial uses, regulators are regularly furnished with a temperature range of 140 degrees to 180 degrees Fahr. Special regulators can be furnished with adjustment for 20 degrees above or below the operating point for temperatures not lower than 50 degrees nor higher than 250 degrees Fahr. The No. 930 Regulator is the same as the No. 931, except that it has the lever and weight method of adjustment instead of the spring type shown here. The extreme sensitiveness, positive action and simplicity of these regulators have placed them in a class by themselves, and made them applicable in hundreds of ways. No. 931 Regulators are furnished regularly in sizes from ½" to 2½" inclusive, and the No. 930 Regulator in sizes from ½" to 5" inclusive.

Ask for Bulletin MT-102.

NO. 980 and NO. 981 TEMPERATURE REGULATORS:

These regulators are used to automatically control temperature of air in dry rooms, etc., and can be furnished with the same temperature ranges, as shown on our No. 930 and 931 Sylphon Temperature Regulators. The thermostatic bulb, of our own special design, is so constructed that it may be placed at any point in the room in which the air is to be controlled, and is connected with the operating valve by a flexible tube of any required length. It is furnished in either the lever and weight type, similar to the No. 930, or the spring adjustment type, similar to the No. 931. The latter is designated as our No. 981.



Ask for Bulletin MT-102.

NO. 932 SYLPHON TEMPERATURE REGULATOR:



This regulator, known as our detachable tube type, is composed of three distinct and separable units. These units are made so that each may be separately removed or replaced for repairs as the case may be. If the flexible tubing should become damaged or broken, the power transmitting unit may readily be replaced by loosening two lock nuts, and the repair part slipped into place. The operation is similar to the No. 930 and No. 931 instruments.

Ask for Bulletin MT-102.

Digitized by Google

NO. 952 PRESSURE REGULATOR:



This regulator will reduce and regulate pressure from any initial pressure to any pressure under 40 pounds and maintain it steadily without any fluctuation. Its extreme sensitiveness makes it possible to reduce the pressure to as low as 2 pounds. The instrument has the spring method of adjustment as used in our No. 931 Sylphon Temperature Regulator. With this regulator it is possible to take the controlling pressure from any desired point.

Ask for Bulletin MT-102.

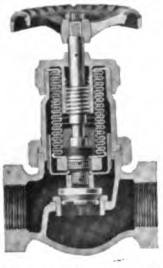
NO. MH 788 HAZARDOUS LIQUID VALVE:



These are designed for use, as the name suggests, in connection with the handling of gasolene, naphtha, etc., under pressures up to 50 pounds. The usual valve stem packing is eliminated by the use of the Sylphon bellows surrounding all moving parts. Approved and recommended by the Underwriter's Laboratories. (No. MH 788.)

Ask for Bulletin MPV-2.

NO. 304 STANDARD PRESSURE PACKLESS VALVE:

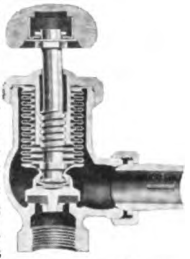


This valve embodies all essentials of high grade construction eliminating the greatest fault of all other valves, LEAKAGE AND FREQUENT REPACKING. The disc and seat are of Monel Metal, both renewable, and can be ground without removing the body from the line.

Now, note the construction—special alloy Sylphon, surrounding the stem and turning parts, forming an ever tight barrier to leakage of steam around the stem, *no packing*, hence no need of *repacking*. The only real advance in valve construction for many years, and is the result of satisfactory service rendered for more than a decade by Sylphon Packless Radiator Valves for low pressure heating work.

Ask for Bulletin MPV-3.

NO. 345 SYLPHON PACKLESS VALVE:



This valve cannot leak water, steam or air around the stem, and is known as our Government type. The turning stem and its support are completely surrounded by the Sylphon which is a one-piece metal member, capable of being elongated as the stem descends and of being compressed as the stem rises. The operating parts are completely inside this protecting Sylphon which forms a forever tight seal between the main passage way and the stem opening. The valve is packless, not so-called, but absolutely PACKLESS. It is furnished with a non-burning handle of rosewood finish.

Ask for Bulletin MPV-1.

NO. 527 VENT VALVE:



For venting mains, long runs of pipe, indirect stacks, drop risers, etc., where a large amount of air must be expelled quickly.

Will benefit all low pressure steam jobs by venting entire piping system and thereby heating radiators quicker under less pressure.

No adjustment.

Does not close against water. Venting port $\frac{3}{32}$" diameter. Valve connection $\frac{3}{8}$" pipe thread. Weight, packed, ½ pound each.

All steam fitters and jobbers are acquainted with the quality of this valve.

Price and other data upon application.

Ask for Bulletin MV-1.

SPECIAL NOTE:

Send for our "*Specifications of Value*," which gives complete engineering data in regard to the above products.

The largest plant in the world devoted to the manufacture of Thermostatic Instruments.

Digitized by Google

JOHNSON SERVICE COMPANY

MILWAUKEE, WIS.

Temperature Regulation and Humidity Control

BRANCHES

BOSTON, 18, MASS., 31 Waltham St.
BUFFALO, N. Y., 2 Erie County Bank Bldg.
CHICAGO, ILL., 177 North Dearborn Street
CINCINNATI, OHIO, 405 Gwynne Building
CLEVELAND, OHIO, 2028 E. 22nd Street
DENVER, COLO., 517 Boston Building
DES MOINES, IOWA, 210 Masonic Temple
DETROIT, MICH., 42 Montcalm Street, West
INDIANAPOLIS, IND., 111 Pembroke Arcade
KANSAS CITY, MO., 411 East Tenth Street
MILWAUKEE, WIS., 149 Michigan Street
LOS ANGELES, CAL. 605 Van Nuys Building
MINNEAPOLIS, MINN., 308 Third Ave., South
NEW YORK, N. Y., 118 East 28th Street
OMAHA, NEBR., 609 Paxton Building
PHILADELPHIA, PA., 1521 Sansom Street
PITTSBURGH, PA., Century Building
PORTLAND, ORE., 404 Failing Building
SAN FRANCISCO, CAL., 417 Rialto Building
SEATTLE, WASH., 452 Coleman Building
ST. LOUIS, MO., 14 North Twelfth Street
SALT LAKE CITY, UTAH, 301 Templeton Bldg.

CANADIAN REPRESENTATIVE

JOHNSON TEMPERATURE REGULATING COMPANY OF CANADA, LIMITED

OFFICES

CALGARY, ALTA., 605 Second Street, West
MONTREAL, QUE., 284 Beaver Hall Hill
TORONTO, ONT., 118 Adelaide Street, West
WINNIPEG, MAN., 259 Stanley Street
VANCOUVER, B. C. 550 Sixth Ave., W.

PRODUCTS AND SERVICES:

Manufacturers of Thermostats and Other Apparatus for the Control of Temperature and Humidity, including:

Thermostats and Humidostats.
"Sylphon" Metal Diaphragm and Rubber Diaphragm Valves.
Air and Water Reducing Valves.
Pneumatic Switches or Push Buttons.

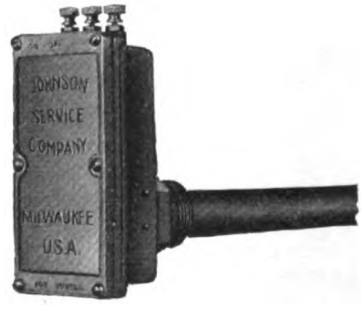
Engineers and Contractors for the Control of Temperature or Humidity for any purpose and over every range used in manufacturing purposes or buildings, furnishing and installing:

Temperature Controlling Apparatus for any and all kinds of heating and ventilating systems.
Temperature Controlling Apparatus for any industrial process requiring the medium of heat.
Control of Humidity in industrial processes requiring artificial humidity.
Temperature Control of hot water tanks and all liquids.
Control of Temperatures of refrigerating and cold storage plants.
Thermostatic Control of electric motors on automatic refrigerating.

SPECIFIC APPLICATIONS OF TEMPERATURE CONTROL:

Bake ovens for enamels, japans, etc.
Core drying ovens.
Drying room for paint, varnish, patent leather, etc.
Storage room for tobacco, rubber or similar goods.
Cold storage rooms, fur vaults, etc.
Canning machinery, cookers, exhausters, processors.
Corn and oats drying apparatus.
Fruit drying apparatus.

JOHNSON ELECTRIC INSERTION THERMOSTAT:



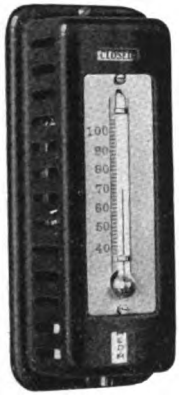
Electric Insertion Thermostat

For insertion in brine systems of electrically driven ice machines, to regulate the temperature of brine by the control of the motor; for insertion through wall of refrigerator, to regulate temperature of cooled space by the control of motor; for regulation of temperature in electrically heated water system or tank, by

Digitized by Google

control of heater; for regulation of temperature in electrically heated compartment, by control of the heater.

JOHNSON ROOM THERMOSTATS:



This thermostat is an all-metal thermostat, 4¾" long, 2" wide and 1¼" high. It is made to work either positively or intermediately as desired. The positive thermostat has an indicator showing when the heat is turned on and off, and a positive cutoff for shutting off the heat permanently when desired.

JOHNSON PNEUMATIC INSERTION THERMOSTAT:

Designed to control temperatures within closed air chambers or ducts. The body of thermostat is a dust-proof case containing the two working parts and extending outside the chamber.

This thermostat is made either positive or graduated acting.

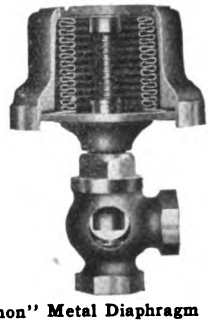
Applications—Adaptable for use in bake ovens for enamels, japans, etc.; drying rooms for paints, varnishes, patent leather, etc.; storage rooms for tobacco, rubber or similar goods; sterilizers or pasteurizers; cold storage rooms, fur vaults, etc.; refrigerator machine control; humidity control for air washers; flue gas temperature control; hot blast heating plants; combination tempered ventilation



Pneumatic Insertion Thermostat

and hot blast systems; greenhouses, turkish bathrooms, etc.; tempered ventilation for buildings.

"SYLPHON" DIAPHRAGM VALVES:



"Sylphon" Metal Diaphragm Valve

The metal diaphragm in this valve is the celebrated "Sylphon" seamless bellows patented and manufactured by The Fulton Company, and the Johnson Service Company is the only company authorized to use this bellows in the diaphragm valves which they furnish with their system.

It is made in all standard sizes and shapes. All small valves have heavy brass bodies and Jenkins discs. Larger valves are of the very best gray iron casting and have Jenkins discs. The valve is adaptable for any service and is practically indestructible through use.

SERVICE:

Service means emphatically the dictionary definition.

Digitized by Google

THE POWERS REGULATOR CO.

Specialists in Automatic Heat Control

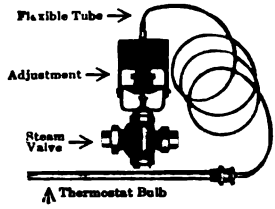
995 ARCHITECTS BLDG., NEW YORK

2776 Greenview Ave. CHICAGO

527 Boston Wharf Bldg. BOSTON

(1546) The Canadian Powers Regulator Co., Ltd., Toronto, Ont.

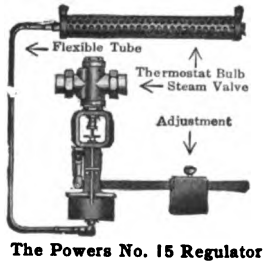
LIQUID TEMPERATURE REGULATOR:



The Powers No. 11 Regulator

For the control of liquid temperatures —water cooling, water heating, steam cookers, pasteurizers, and baths, hot water tanks, cooling water tanks, feed water heaters, glue heaters, etc. All metal construction. Entirely automatic and self-contained. Ask for Bulletin 129.

AIR TEMPERATURE REGULATOR:

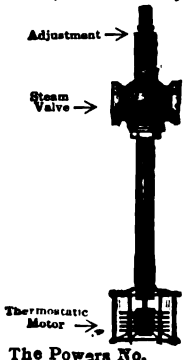


The Powers No. 15 Regulator

For control of air temperatures. The thermostatic bulb is so constructed that it may be placed at any point in the room to be controlled, and connected with the steam valve by a flexible tube, of any required length. It is very sensitive and reliable. Self-contained, and entirely automatic. Ask for Bulletin 138.

OPEN VAT REGULATOR:

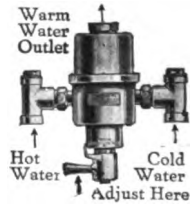
The No. 16 is particularly effective for control of liquids in open tanks, cooking vats, hog scalders, scrapers, tripe washers, etc. Self-contained. Automatic. Reliable. Ask for Bulletin 139.



The Powers No. 16 Regulator

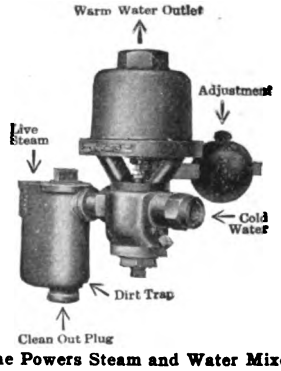
HOT AND COLD WATER MIXER:

The Powers Water Controllers are true automatic thermostatic mixers, not to be compared with mechanical mixers, anti-scald valves, etc. They are built in several sizes for bath rooms, showers (singly, or in gangs), water line control, etc. Another type provides for a wider range of control, especially adapted to certain industrial processes. Ask for Bulletin 124.



The Powers Water Mixer

INSTANTANEOUS WATER HEATER:



The Powers Steam and Water Mixer

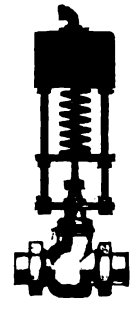
The Steam and Water Mixer is an instantaneous water heater, thermostatically controlled, making it absolutely safe against scalding.

Mixes live steam and cold water. Adapted to wash sinks, shower baths, etc., in industrial plants. The most economical installation for supplying hot water. Ask for Bulletin 137.

PRESSURE REGULATOR:

The Powers all-metal construction is here applied to pressure reducing valves, for steam, air, and water. Simple, durable, accurate, reliable. Effective regardless of varying initial pressures. Used with success on sterilizers, vulcanizers, cooking retorts, etc., etc.

Ask for Bulletin 118.



The Powers Pressure Reducing Valve

Digitized by Google

THE POWERS REGULATOR CO. NEW YORK, N. Y.

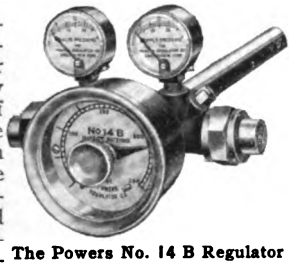
DIAPHRAGM MOTOR VALVE:



The Powers All Metal Valve.

The All Metal Valve is designed for thermostatic and pneumatic control of fluids. Adapted to a great variety of industrial processes. Is called the *"Lastforever" Valve*, because it is extremely elastic, and durable almost without limit. Recommended especially for the critical conditions where the rubber diaphragm proves unsatisfactory. Ask for Bulletin 144.

WIDE RANGE REGULATOR:



The Powers No. 14 B Regulator

This regulator is adjustable over an unusually wide range of temperature and finds an extensive use in the industrial field where exceedingly accurate control of heating and cooling medium is required.

It utilizes compressed air as a motive power. Is absolutely reliable, and sensitive to a fraction of a degree.

Used for cold storage rooms, dry kilns, japanning ovens, varnish rooms, pasteurizers, air washers, leather dryers, etc. Bulletin 132.

CONDENSATION CONTROL:



The Powers High Pressure Steam Trap

A small and extremely efficient trap for apparatus using high pressure steam for heating sterilizers, vulcanizers, dryers, enameling ovens, steam kettles, steam tables, etc., etc. Absolutely positive in operation, discharging freely a large volume of water, but closing tight against steam above the stipulated pressure. Ask for Bulletin 115.

INDUSTRIAL THERMOMETERS:



The Powers Extension Bulb Thermometer

The Powers Thermometer is a reliable, readable thermometer at a reasonable price. It may be used to indicate air or liquid temperature at a distance of many feet if desired. White dial 4½ inches in diameter with large readable figures in black. Is valuable where poor light or inaccessibility makes the ordinary thermometer hard to read. Furnished with either rigid or flexible extension bulb. Ask for Bulletin 140.

ROOM TEMPERATURE CONTROL:



The Powers Thermostat



The Powers All Metal Radiator Valve

Industrial establishments are fast awakening to the fact that automatic control of temperature in offices and shops is a necessity if production is to be maintained at the maximum. Over-heated rooms mean a slowing up of workers, a menace to health, and a waste of fuel and labor. Rooms insufficiently heated mean less work accomplished because of clumsiness of cold fingers, more accidents, substandard results, and wasted materials.

The Powers Systems of Temperature Regulation is noted for its great accuracy and durability. May be installed in old or new buildings, for all, or any portion of the rooms.

The thermostat illustrated is typical of the Powers System. Wherever you see one, you may be assured that the system *works*. Smaller and more ornamental thermostats are supplied for residences, etc., if desired.

Another feature of the Powers System is the All Metal Radiator Valve—famous as the "Lastforever" Valve.

SEE OUR ADVTS. IN MECHANICAL ENGINEERING THE JOURNAL OF THE A.S.M.E.

Ask for Bulletin 150 for further particulars.

Digitized by Google

SARCO COMPANY, INC.

9 BARCLAY ST., NEW YORK

PHILADELPHIA BUFFALO DETROIT CLEVELAND CHICAGO

Steam Traps, Radiator Traps, Temperature Regulators, Metallic Gaskets



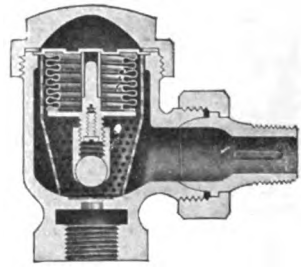
STEAM TRAP SARCO:

The Steam Trap Sarco derives its operating force from the expansion and contraction of a heavy hydrocarbon oil hermetically sealed in a cartridge. The trap requires simply to be put in position and the cartridge unscrewed a few turns. When the steam has heated the cartridge, expanding the fluid and forcing out piston, the cartridge is gently screwed forward, closing off the steam.

The adjustment can then be locked and the trap works automatically. As soon as water collects the operating fluid in the cartridge contracts and the valve opens discharging the water. Steam following the water expands instantly the operating fluid and closes the trap.

Owing to the principle of operation, no large storage capacity is required in the trap and this means a very small trap and low cost. The Sarco is the only thermostatic trap made for high pressure. It is connected straight on the line and requires no floor space or building up. It is, therefore, very easily installed.

Size Inches	Low Pressure 0–50 Lbs.	High Pressure 50–200 Lbs.
⅜	6.00	7.75
½	6.00	7.75
¾	9.45	10.35
1	11.25	12.00
1¼	24.15	28.50
1½	30.00	34.50
2	38.70	48.30
2½	51.75	60.00
3	60.00	75.00



THE NEW SARCO RADIATOR TRAP:

The Sarco Radiator Trap, Type E consists of four parts: thermostatic element, body, cap and union nipple. It is factory adjusted and can be used on vapor or vacuum heating systems, any degree of vacuum or any pressure up to 20 pounds. Absolutely no adjustment necessary. The thermo element consists of a spirally corrugated tube comparatively large in diameter, closed at one end by a solid head. The other end is so attached to the body of the valve, inside of which it is contained, as to divide the body into two chambers. Space between the expanding unit and the body forms an expansion chamber which is filled with a volatile liquid.

Valve stem is fastened to one end of expansion tube head; other end carries socket holding free revolving ball valve head. A conical strainer is fitted to body.

When steam is off, the valve is open. When steam comes in contact with inside of thermo element, the volatile liquid is expanded, moving the valve downward to its seat. Valve remains closed until condensate reaches the trap, causing volatile liquid to contract and open valve. Steam closes valve and the cycle is repeated whenever condensate collects.

Size Inches	Length Over All Inches	Distance Center Inlet to Outlet Inches	Distance Center of Valve to Face Inlet Inches	Price Each
½	3⅝	1½	2¾	6.00
¾	3⅝	1½	2¾	8.00

Digitized by Google

TEMPERATURE REGULATORS FOR LIQUID AND ATMOSPHERE:



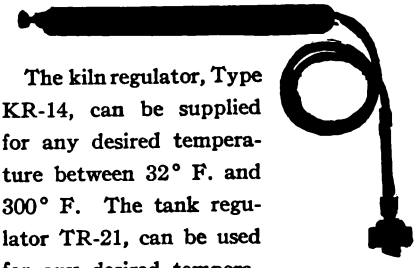
Type TR-21

Sarco Temperature Regulators derive their actuating motive power from expansion and contraction of a sensitive liquid hermetically sealed within the apparatus, and they require no exterior operating means. Sarco Regulators are made in three standard types: for room temperature control, for dry kiln work and for tank control. All are supplied for a given temperature and can be adjusted by the user for any temperature 10° F. above or 10° F. below that for which the regulator is calibrated at the works.

Where the user desires to reset the regulator for temperatures within a wide range, e. g. 100° F. or 50° plus and minus, Type TR-25 is used. This type has a double thermostatic element but is otherwise identical in construction with the Type TR-21. This type, altho special, has been very successfully adopted for many purposes and is thoroughly efficient.

(Prices on application.)

Sarco Temperature Regulators of other types can also be made to meet special conditions, and inquiries are invited.



Type KR-14 Designed Specially for Dry Kiln Work

The kiln regulator, Type KR-14, can be supplied for any desired temperature between 32° F. and 300° F. The tank regulator TR-21, can be used for any desired temperature of liquids or atmosphere between 32° F. and 300° F.

Sarco Temperature Regulators are supplied with direct acting valves closing with rise of temperature or reverse acting valves, opening with rise of temperature. They control steam, water or gas lines. They are also supplied with electric switches instead of valves if so desired.

Type TR-21 Sarco Temperature Regulator for Liquids and Dry Kilns:

Size Inches	Weight Pounds	List Price
½	8	$75.00
¾	8	80.00
1	9	85.00
1¼	13	90.00
1½	22	95.00
2	28	100.00
2½	37	115.00
3	51	135.00
4	81	185.00
5	132	250.00
6	158	300.00

Type KR-14 Sarco Temperature Regulator for Atmosphere up to 300° F.:

Size of Valve	List Price
½"	$60.00
¾"	65.00
1"	70.00
1¼"	75.00
1½"	85.00
2"	95.00
2½"	110.00
3"	130.00
4"	170.00

Digitized by Google

THE DOLE VALVE CO.

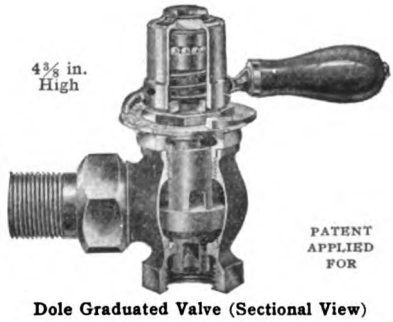
1923–1933 CARROLL AVE., CHICAGO, ILL.

Manufacturers of Packless Radiator Valves & Double Compression Couplings

DOLE PACKLESS GRADUATED VALVE:

The Ideal Valve for Vacuum or Vapor Steam Heating

The Dole Graduated or Modulating Valve is as carefully built as a watch—and as easily understood. Placed at



Dole Graduated Valve (Sectional View)

the top of the radiator—where it is easily accessible without stooping—any degree of heat can be obtained with less than a half turn of the handle. Besides being the best-looking modulating valve, the Dole is the best constructed. Its packless feature—which has proved its utter practicability in over 250,000 installations—guarantees against leakage.

A short study of the sectional view shown will prove that in designing the Dole Packless Graduated Valve we have mastered all requirements necessary to make a perfect working Graduated or Modulating Valve.

Highly Finished:

The Dole Modulating Valve is heavily nickeled and will retain its bright, handsome appearance indefinitely. Its exceptionally low height prevents it from protruding above the radiator.

Packless:

A feature which has made the Dole a permanently leakless valve. Overcomes the "packing-in-the-stuffing-box" method of construction which has caused endless trouble and damage by its leakiness.

Durably Constructed:

The Dole Valve is designed for practically everlasting service. The casting is of the best steam bronze—every detail carefully machined. The handle is polished mahogany finish.

Ball-Bearing:

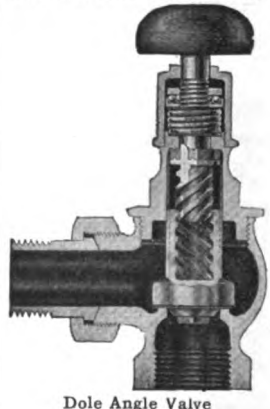
An exclusive feature. No matter how long the valve has been unused it can never stick nor bind. When closed it shuts off absolutely tight.

Should any adjustment be desired *after* the valve is fitted and installed, all that is necessary is simply to loosen octagon nut on top of dial with special wrench, which is furnished for the purpose, turn dial to left to the desired point, then tighten nut. This adjustment is easily made *while the steam is on.*

Made in ½", ¾", 1", 1¼", 1½" and 2" sizes.

DOLE PACKLESS RADIATOR VALVES:

Dole Packless Radiator Valves are made in Angle, Right-hand Corner, Left-hand Corner, Straight-way Globe, and Straight-way Gate Styles.



Dole Angle Valve (Sectional View)

The sectional cut shown illustrates clearly the quick-opening feature, the double spiral thread, the one-piece rotating stem of properly proportioned size, and the manner in which the stuffing box of the ordinary valve has been eliminated.

Specify Dole Packless Radiator Valves. They are fully guaranteed.

Send for our Catalogue.

Digitized by Google

C. A. DUNHAM COMPANY

230 East Ohio Street, CHICAGO

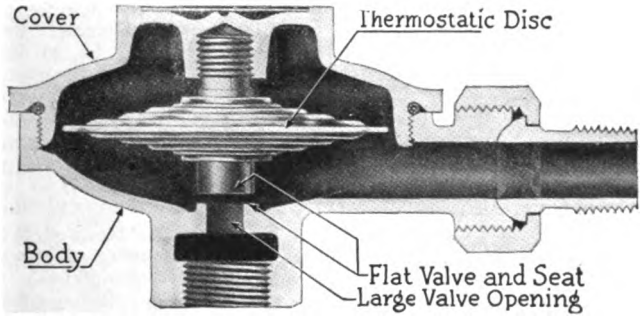
FACTORIES: Marshalltown, Iowa
Toronto, Canada

52 Branch and Local Sales Offices in the United States and Canada

London: 233-A Regent Street, W. 1

Paris: 64 Rue du Rocher

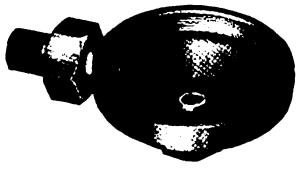
DISTRIBUTORS: Munzing & Cie, 47 Rue de la Fontaine-au-Roi



DUNHAM HEATING SERVICE

DUNHAM RADIATOR TRAP:





The Dunham Radiator Trap is distinctive in the simplicity of its construction. It consists of two major parts, a body, and a cover. In the cover the operating member, the Dunham Thermostatic Disc, is securely placed. It has an exceptionally large valve opening. There are no loose parts in the path of flow, no sliding contacts, nothing to gum up, and no guide or pin to obstruct the valve opening. The position and design of the valve is such that it is self-cleaning. The action of the disc is positive and the valve seats squarely like a globe valve, the tightest of all types of valves. All of the working parts of the Dunham Radiator Trap are made of non-corrosive material of the best quality.

DUNHAM SPECIALTIES:

Radiator Traps	**Suction Strainers**
Drip Traps	**Air Vents**
Blast Traps	**Return Traps**
Air Line Valves	**Check Dampers**
Oil Separators	**Damper Regulators**

Packless Radiator Valves

Vacuum Pump Governors

Reducing Pressure Valves

The following data gives some information about the Dunham Thermostatic Trap which is for operation on pressures ranging from 15 in. of vacuum to 10 lbs. gauge.

Trap No.	Size	Capacity, Lbs. of Water	Capacity Direct Rad.	Weight
1	1/2"	25	100	28 oz.
2	1/2"	85	350	46 oz.
3	3/4"	110	450	53 oz.
4	3/4"	375	1500	12 1/2 lb.
5	1"	750	3000	21 lb.
8	2"	3000	12000	90 lb.

Digitized by Google

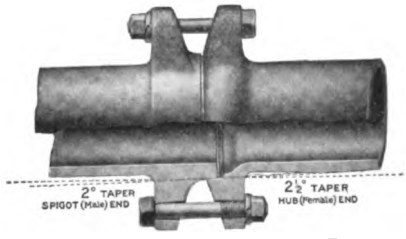
THE CENTRAL FOUNDRY COMPANY

90 WEST STREET, NEW YORK

CHICAGO ATLANTA SAN FRANCISCO DALLAS

Manufacturers of Universal Pipe, Soil Pipe, F. & W. Fittings, General Castings

UNIVERSAL PIPE:



PIPE AND JOINT ARE ONE

Universal Pipe is cast iron pipe with hub and spigot ends, the contact surfaces of which are machined on a taper giving a natural iron to iron joint, which is permanently tight. By making the tapers of slightly different pitch the joint provides for expansion and contraction, vibration and uneven ground settlement.

The lengths of pipe are drawn together by bolts, two bolts to a joint sufficing except for pressures above 175 pounds in some sizes. The pipe can therefore be laid at a slight labor cost, and without calking. No molten lead, oakum, etc., required. No equipment, except two wrenches.

228

The iron to iron contact of the Universal Joint eliminates electrolysis. The result is a pipe that does not leak and a joint that will remain tight under pressure even up to 300 pounds.

High Pressure Service: Universal Pipe is especially adapted to high pressure service, and particularly for high pressure fire lines. There is no packing to blow out, and nothing to deteriorate.

Subaqueous Work: Lines running under rivers or submerged work of any kind can be easily and economically constructed by the use of Universal Pipe.

No molten lead required, the pipe can be laid in wet trenches or in shallow water without special equipment.

Gas Systems: Universal Pipe is particularly advantageous in high or low pressure gas lines, by reason of the tight joint under differences of temperature and its freedom from electrolysis. The close contact of the smooth machined hub and spigot ends makes a joint through which gas cannot escape.



TRADE MARK

Curved Lines: Straight lengths of Universal Pipe may be laid on a curve of 100 feet radius.

SPECIFICATIONS

Nominal Inside Diameter	Class No. 100 100 Lbs. Pressure			Class No. 130 130 Lbs. Pressure			Class No. 175 175 Lbs. Pressure			Class No. 250 250 Lbs. Pressure			Bolt Sizes
	Approx. Thickness Inches	Estimated Weight Pounds per		Approx. Thickness Inches	Estimated Weight Pounds per		Approx. Thickness Inches	Estimated Weight Pounds per		Approx. Thickness Inches	Estimated Weight Pounds per		
		Foot	6-Ft. L'gth		Foot	6-Ft. L'gth		Foot	6-Ft. L'gth		Foot	6-Ft. L'gth	
2	..	...	..	..	..	..	.35	8½	51	.39	9½	57	½ x 3¼
3	...	...	...	...	...	...	.37	13	78	.42	14½	87	½ x 4¼
4	.37	18	108	.40	18¼	112½	.43	20¼	121½	.45	21¼	127½	⅝ x 5
6	.43	30	180	.45	31	186	.47	32	192	.51	35½	213	¾ x 6
8	.47	44¼	265½	.49	46	276	.525	49¼	295½	.58	53¼	319½	⅞ x 6½
10	.50	60½	363	.53	63½	381	.58	67¾	406½	.64	74	444	1 x 7½
12	.53	75½	453	.57	80½	483	.62	87	522	.70	97½	585	1 x 8
14	.565	94½	567	.60	99½	597	.66	107½	645	.76	124	744	1⅛ x 9
16	.60	115½	693	.65	123	738	.72	134	804	.83	156	936	1¼ x 9½

Lengths lay a full six feet. All pipe tested with a minimum hydrostatic pressure of 300 pounds per square inch.

Special Castings are made with Universal hub and spigot openings, thus avoiding, except in extreme cases, the use of nipples. The lugs upon special castings are in one plane so that the branches or openings will all be in the same plane.

Approved by Fire Underwriters: Universal Pipe and Fittings have been tested and approved for fire protection service by the Underwriters' Laboratories which are under the direction of the National Board of Fire Underwriters.

SEE OUR ARTICLE IN MECHANICAL ENGINEERING THE JOURNAL OF THE A.S.M.E.

Digitized by Google

LYNCHBURG FOUNDRY COMPANY

LYNCHBURG, VIRGINIA

MAIN OFFICE
LYNCHBURG, VA.

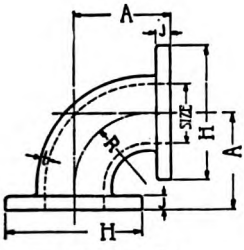
WESTERN SALES OFFICE
1212 PEOPLES GAS BUILDING
CHICAGO, ILLINOIS

EXPORT OFFICE
95 LIBERTY ST., N. Y.

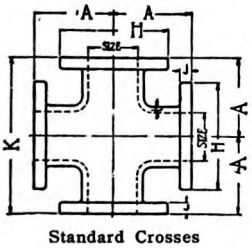
WORKS—LYNCHBURG, VA.—RADFORD, VA.

Manufacturers of Cast Iron, Bell and Spigot Pipe and Fittings
Cast Iron Flanged Pipe and Fittings; Municipal Castings of Every Description
General Founders and Machinists

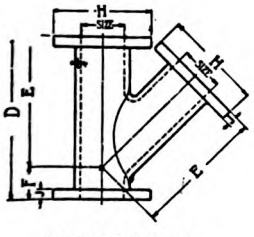
AMERICAN STANDARD CAST IRON FLANGED PIPE AND FITTINGS:



Standard Ells



Standard Crosses



Standard Laterals

Letters refer to dimensions given under respective headings in the table in adjoining column.

TABLE OF DIMENSIONS
Standard 125 lbs. Pressure

SIZE	A	D	E	F	H	J	K	R	t
1	3½	7	5¾	1¾	4	7/16	7	2¾	7/16
1¼	3¾	8	6¼	1¾	4½	½	7½	3	7/16
1½	4	9	7	2	5	9/16	8	3¼	7/16
2	4½	10½	8	2½	6	5/8	9	3½	7/16
2½	5	12	9½	2½	7	11/16	10	4	7/16
3	5½	13	10	3	7½	3/4	11	4½	7/16
3½	6	14½	11½	3	8½	13/16	12	5	1/2
4	6½	15	12	3	9	13/16	13	5¼	1/2
4½	7	15½	12½	3	9¼	13/16	14	5¾	1/2
5	7½	17	13½	3½	10	13/16	15	6¼	1/2
6	8	18	14½	3½	11	1	16	6¾	9/16
7	8½	20½	16½	4	12½	1 1/16	17	7¼	5/8
8	9	22	17½	4½	13½	1 1/8	18	7½	5/8
9	10	24	19½	4½	15	1 1/8	20	8½	11/16
10	11	25½	20½	5	16	1 3/16	22	9½	3/4
12	12	30	24½	5½	19	1 1/4	24	10½	13/16
14	14	33	27	6	21	1 3/8	28	12¼	7/8
15	14½	34½	28½	6	22¼	1 3/8	29	12¾	7/8
16	15	36½	30	6½	23½	1 7/16	30	13¼	1
18	16½	39	32	7	25	1 9/16	33	14½	1 1/16
20	18	43	35	8	27½	1 11/16	36	16	1 1/8
22	20	46	37½	8½	29½	1 13/16	40	17¾	1 3/16
24	22	49½	40½	9	32	1 7/8	44	19½	1 1/4

Standard fittings guaranteed for 125 lbs. working pressure.

Extra heavy fittings guaranteed for 250 lbs. working pressure.

AMERICAN WATER WORKS ASSOCIATION CAST IRON BELL AND SPIGOT PIPE AND FITTINGS:

Catalogs mailed upon request.

Digitized by Google

JAMES B. CLOW AND SONS

Established 1878

CHICAGO, ILL.

NEW YORK MILWAUKEE DETROIT MINNEAPOLIS ST. LOUIS
PITTSBURGH SAN FRANCISCO PHILADELPHIA

Manufacturers of Cast Iron Pipe, Plumbing and Heating Supplies

PIPE:



Steel or Wrought Iron Threaded:

We can furnish random lengths of steel or wrought iron pipe in all standard sizes either black or galvanized. Cut lengths to order.



Cast Iron Hub and Spigot:

Carried in stock in sizes from 3 to 48 inches. 12-foot lengths are regular—shorter lengths will be cut to order. This pipe is made in all classes for all pressures.



Cast Iron Flanged:

Made in all sizes from 1¼ to 48 inches and in all classes for all pressures. 12-foot lengths are regular—shorter lengths will be cut to order.



Cast Iron Threaded:

This pipe is made in all sizes from 1¼ to 16 inches, inclusive. It is threaded at both ends the same as steel or wrought iron pipe. 12-foot lengths are regular.

FITTINGS:



Cast Iron or Malleable Screwed:

We carry a very large stock of screwed fittings in both cast iron and malleable iron, black or galvanized straight and reducing.



Cast Iron Hub and Spigot:

Water and gas fittings are carried in stock in all sizes from 3 to 48 inches, in straight and reducing sizes. We also have cutting-in specials of all kinds.



Cast Iron Flanged:

We carry a very large stock of flanged cast iron fittings in all standard sizes for low, standard and extra heavy pressures, both straight and reducing.



Cast Iron Threaded:

We make a complete line of cast iron threaded fittings for use with our threaded cast iron pipe. In both straight and reducing sizes.

All Pipe and Fittings Carried in Stock for All Pressures.

Castings for Special Purposes Made to Order.

Digitized by Google

JAMES B. CLOW AND SONS — CHICAGO, ILL.



Showroom, Chicago

In our CHICAGO BUILDING we carry a complete stock of the following material:

Plumbing Supplies including Drinking Fountains, Automatic Water Closets, Lavatories, Sinks, etc.

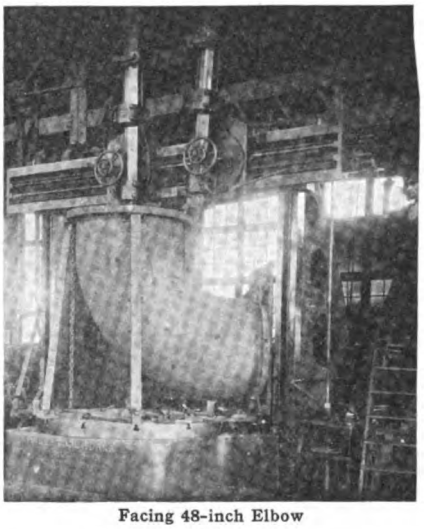
Steam Supplies including Steel and Wrought Iron Pipe, Cast Iron and Malleable Fittings, Low, Standard and Extra Heavy Valves with Screwed—Flanged—Hub and Spigot Connections—Straightway—Angle—Check—Flap—Gate, etc.

Water Works Supplies including Cast Iron Bell and Spigot—Flanged and Threaded Pipe and Fittings—Lead—Oakum—Tools, etc.

We also manufacture in Chicago the Ultra Violet Ray Water Sterilizers, Marble Products for all purposes and all Brass work for our plumbing business including Faucets, Bibbs, Traps, Supplies, Showers, etc.



Square Manhole Frame and Cover



Facing 48-inch Elbow

At out Ohio Plants, which specialize on making Cast Iron Pipe and Fittings, a complete line of Cast Iron Specialties is also produced. These include the following: Manholes—Lamp Posts—Fountains—Special Castings for Coke Ovens—Filtration Plants—Sugar Refineries—Chemical Companies—Oil Refineries, etc.—Radiators—Boilers—Plumbing Specialties such as Bell Traps—Drum Traps—Gratings, etc.

CATALOGUES:

Complete Catalogues will be gladly sent to you describing that in which you are interested.

Plumbing—*Catalogue "M."*

Drinking Fountains—*Fountain Catalogue.*

Heating—*Special Catalogue.*

Cast Iron Pipe, Fittings and Foundry Products—*Pipe Economy.*

Steam and Water Work Supplies—*Catalogue "A."*

Water Sterilization—*R. U. V. Catalogue.*

Digitized by Google

UNITED STATES CAST IRON PIPE & FOUNDRY COMPANY

GENERAL OFFICE: BURLINGTON, NEW JERSEY

Manufacturers of Cast Iron Pipe—Bell and Spigot, Flange, Flexible Joint, High Pressure, Plain End and Threaded. Fittings—Bell and Spigot, Flange, Steam—Semi-Steel and Cast Iron, Standard and Special. Columns—Cast Iron Building. Culverts—Cast Iron. Condensers—Barometric. Castings—Chemical and Gray Iron, Semi-Steel, Hydraulic, Etc., 1 Lb. to 50 Tons

SALES OFFICES

Philadelphia, 1421 Chestnut St.
Chicago, 122 So. Michigan Blvd.
San Francisco, Monadnock Bldg.
Dallas, Tex., Scollard Bldg.
Pittsburgh, Henry W. Oliver Bldg.
St. Louis, Security Bldg.
New York, 71 Broadway
Birmingham, Ala., Am. Trust Bldg.
Buffalo, 957 E. Ferry St.
Cleveland, 1150 E. 26th St.
Minneapolis, Plymouth Bldg.

WORKS

ADDYSTON, OHIO
ANNISTON, ALA.
BESSEMER, ALA.
BURLINGTON, N. J.
BUFFALO, N. Y.
SCOTTDALE, PA.
BIRMINGHAM, ALA.
CHATTANOOGA, TENN.
LOUISVILLE, KY.
CLEVELAND, OHIO
COLUMBUS, OHIO

Standard Thicknesses and Weights of Cast Iron Pipe

As made by United States Cast Iron Pipe & Foundry Co. and adopted May 12th, 1906, by American Water Works Association

Nominal Inside Diam. Inches	Class A 100 Ft. Head 43 Lbs. Pressure			Class B 200 Ft. Head 86 Lbs. Pressure			Class C 300 Ft Head 130 Lbs. Pressure			Class D 400 Ft. Head 173 Lbs. Pressure			Ap'r'x-imate pounds Lead p'r J'nt 2 in. Thick	Ap'r'x-imate pounds Hemp per Joint
	Thick-ness Inches	Weight per		Thick-ness Inches	Weight per		Thick-ness Inches	Weight per		Thick-ness Inches	Weight per			
		Foot	L'gth		Foot	L'gth		Foot	L'gth		Foot	L'gth		
3	.39	14.5	175	.42	16.2	194	.45	17.1	205	.48	18.0	216	6.00	.18
4	.42	20.0	240	.45	21.7	260	.48	23.3	280	.52	25.0	300	7.50	.21
6	.43	30.8	370	.48	33.3	400	.51	35.8	430	.55	38.3	460	10.25	.31
8	.46	42.9	515	.51	47.5	570	.56	52.1	625	.60	55.8	670	13.25	.44
10	.50	57.1	685	57	63.8	765	.62	70.8	850	.68	76.7	920	16.00	.53
12	.54	72.5	870	.62	82.1	985	.68	91.7	1100	.75	100.0	1200	18.00	.61
14	.57	89.6	1075	.66	102 5	1230	.74	116.7	1400	.82	129.2	1550	22.00	.81
16	.60	108.3	1300	.70	125.0	1500	.80	143.8	1725	.89	158.3	1900	30.00	.94
18	.64	129.2	1550	75	150 0	1800	.87	175.0	2100	.96	191.7	2300	33.80	1.00
20	.67	150.0	1800	.80	175.0	2100	.92	208.3	2500	1.03	229.2	2750	37.00	1.25
24	.78	204.2	2450	.89	233.3	2800	1.04	279.2	3350	1.16	306.7	3680	44.00	1.50
30	.88	291.7	3500	1.03	333 3	4000	1 20	400.0	4800	1.37	450.0	5400	54.25	2.06
36	.99	391.7	4700	1.15	454.2	5450	1.38	545.8	6550	1 58	625.0	7500	64.75	3.00
42	1.10	512.5	6150	1.28	591.7	7100	1.54	716.7	8600	1.78	825.0	9900	75.25	3.62
48	1.26	666.7	8000	1.42	750.0	9000	1.71	908 3	10900	1.96	1050.0	12600	85.50	4.37

The above weights are per length to lay 12 feet, including standard sockets, proportionate allowance to be made for any variation.

U. S. CAST IRON PIPE:

Cast Iron Pipe with bell and spigot joints is the standard material for water and gas installations throughout this country. The satisfaction it affords is well-known. Even without a protective coating applied to all water pipe it successfully resists corrosion for centuries.

We manufacture Cast Iron Pipe for Water, Sewers, Gas, Drains, Culverts, Oil, High Pressure Fire Protection, of stations, warehouses, terminal shops, etc. Power and Industrial Plant Piping and Submerged Lines. In all sizes, 2" to 84" diameter.

Digitized by Google

UNITED STATES CAST IRON PIPE & FOUNDRY CO.
BURLINGTON, N. J.



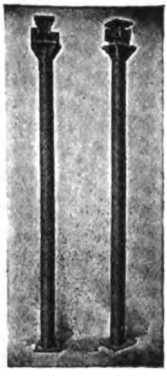
Special Breeches Pipe

FITTINGS:

Standard and Special: Bell and Spigot to American Water Works Standard. Flanged to A. S. M. E. 1914 Standard. American Gas Institute Standard.

Also, standard high pressure fittings for fire service. Standard flanged fittings for refinery condenser coils. Special fittings of all types to Engineers' designs.

KEYSTONE COLUMNS are of cast iron, and are supplied with specially designed base plates and caps or with



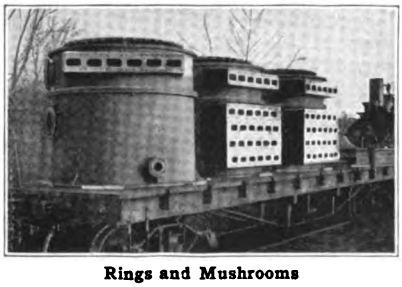
"Keystone" Columns

our Combination Caps where floor beam connections are required. They are widely used in the construction of Churches and Schools, Factories, Mills, Warehouses, Sheds, Stores, and other commercial buildings, and for many special purposes.

BAROMETRIC CONDENSERS:

Made in accordance with recent improvements for economical operation, in all regular sizes.

GENERAL CASTINGS:



Rings and Mushrooms

Chemical, Sugar House and Machinery Castings. 1 lb. to 50 tons in the rough or machined. **Hydraulic cylinders, presses, accumulators, caustic pots, retorts, montejus, refining kettles, refrigerator tanks, etc.**

SEE OUR ADVTS IN MECHANICAL ENGINEERING THE JOURNAL OF THE A.S.M.E.

Digitized by Google

M. J. DOUGHERTY CO.

FACTORY AND MAIN OFFICE

25TH & WASHINGTON AVE., PHILADELPHIA, PA.

NEW YORK ATLANTA CLEVELAND AKRON DETROIT

PIPING FABRICATORS AND CONTRACTORS

Pipe Bends, Welded Pipe Headers, Valves, Flanges, Fittings, Etc., and Fabricated Pipe Work of Every Description for High & Low Pressure Steam, Water, Air and Oil Lines

THE SQUARE LAP FLANGE:

The Square Lap Flanged Joint is made by turning over the end of the pipe and facing off to insure even bearing of the gaskets. The flange is loose, thus saving the erector time in setting the bolt holes in place. The lap being rolled to the inside edge of the bolt hole, maximum bearing for gasket is obtained, and the water pocket



eliminated. The lap is 75% heavier at the radius than the walls of the pipe, and machined on the face, edge and back. All joints in the assembly opposite (one of the 40 Air Pressure Condenser Stills made for a large Oil Refinery) except the two large outlets in the bottom header manifold were fabricated with Square Lap Joints.

PIPE BENDS:

The inauguration of high pressure boilers and engines has necessitated many marked improvements in the piping of steam plants. To allow for expansion and contraction, and to give flexibility in pipe lines, special bends are now a necessity. Our factory is equipped to bend pipe of any diameter to sketch and to fit same with screwed, welded or with our improved Square Lap Flanged Joint.

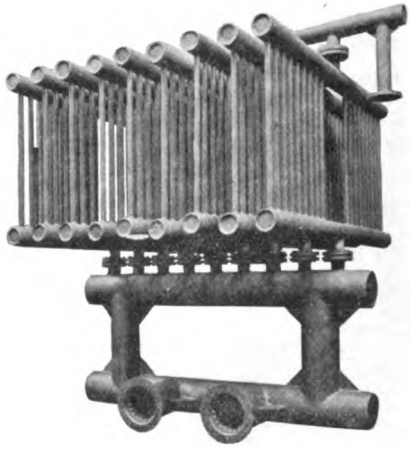
WELDED STEEL HEADERS:

Steel headers with welded nozzles are recommended for severe service and super-heated steam, as they reduce the number of joints under all steam, water or



any other liquid conditions. They prevent leaky joints, and give as near one hundred per cent piping results as are possible. No better example of welded pipe work could be selected than that shown below. All the necks and connections in each unit are so made and in such a manner that effected a lastingly tight connection.

Equipment of all welded headers with the Square Lap Flanged Joint is recommended on all high pressure steam lines.



OUR INCREASED FACILITIES:

Having recently acquired increased facilities by taking over a larger factory in which has been placed the most modern equipment in the East for fabricating piping for High and Low Pressure Steam, Water, Air or Oil Lines, we can now offer the M. J. D. Service to a larger field of clients.

An organization is generally known by the reputation of its clients. Our long list, much too great to itemize here, would read like the Honor Roll of Modern Plant Design. Our erecting crews are now scattered all over the East.

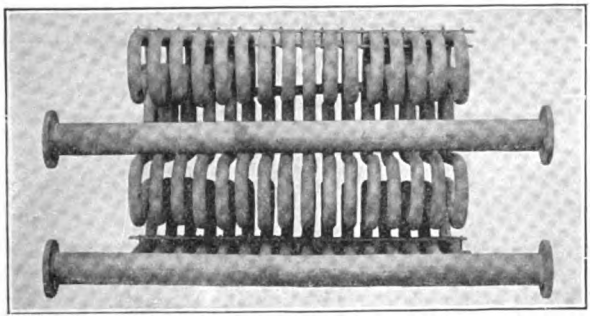
SEE OUR ARTICLE IN MECHANICAL ENGINEERING A-5448

Digitized by Google

SIMMONS PIPE BENDING WORKS

MAIN OFFICE: 40 MECHANIC ST.,
FACTORY AND WAREHOUSE: AVE D & MURRAY ST., NEWARK, N. J.

Piping Fabricators. Bends, Welded Headers, Van Stone Joints Coils, General Supplies



Welded Superheater Coil

Van Stone Joints:

For long lasting leakless service specify Simmons Van Stone Joints. Swiveling flanges eliminate trouble in erecting.

Pipe Bends:

Reduce frictional losses and provide compensation for expansion and contraction.

Welded Headers:

Light unit construction, reduce number of joints. Cheaper than steel fittings. Nozzles can be any size and placed in any position.

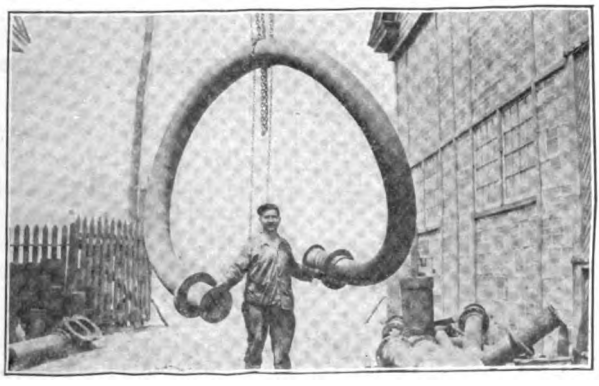
Bends and headers furnished with Van Stone Joints in steel or cast iron standard or extra heavy.

Coils:

Made to your specifications in any material. All coils tested by hydrostatic pressure before shipment.

Quotations furnished. Send blue print or sketch.

Copy of tests on our Van Stone Joints sent to any A. S. M. E. member on request.



Expansion Loop Van Stone Joints

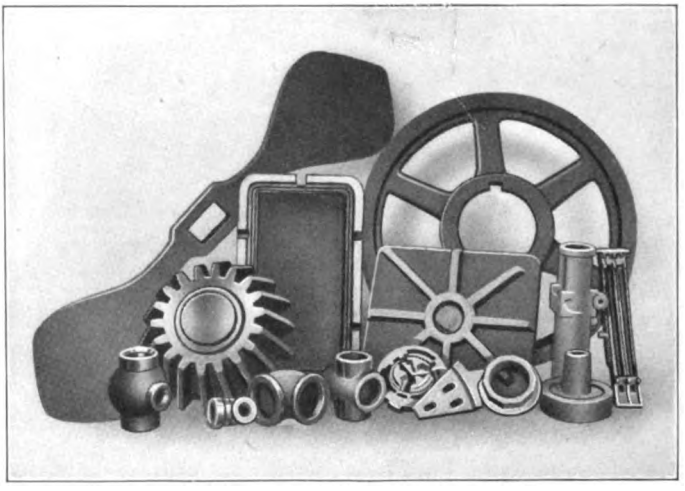
Digitized by Google

MALLEABLE IRON FITTINGS CO.

Incorporated 1864

BRANFORD, CONN.

Manufacturers of Malleable Iron Pipe Fittings for Gas, Steam and Water; Steel Fittings for High Pressure Service; Air Furnace Refined Malleable Iron and Semi-Steel Castings; Carbon and Alloy Steel Castings; Foundry Vibrators; Boat Hardware; Clamps; Oilers; and Hardware Specialties



EXTRA HEAVY FLANGES:

For High Pressure Requirements

For Rolled, Shrunk or Welded Connection, bored, countersunk, grooved, faced and drilled to specification.

HIGH PRESSURE FITTINGS:

Standard Sizes in Stock in Steel or Malleable

Machined, tested and ready for the line. Specials made to order for railroad, manufacturing, mining and municipal power plants in compliance with Lloyds Rules or Regulations of the U. S. Steamboat Inspection Service.

MALLEABLE IRON AND SEMI-STEEL CASTINGS:

For Machinery; Automobile; Gun; Sewing-Machine; Overhead, Third-Rail, underground Electrical Construction and all miscellaneous work.

LOW CARBON STEEL CASTINGS:

Equal to Crucible Steel Castings.

SPECIAL METAL "A:"

For Gears and Cams where resistance to wear is wanted. May be heat-treated to required hardness.

AIR FURNACE REFINED VANADIUM IRON:

For Hydraulic Cylinders, Piston Rings, Forging Dies, Heavy Duty Gears, etc. Has a high tensile strength; and is tough, sound and dense.

CUSTOM AND JOBBING DEPARTMENT:

Galvanizing, Tinning, Japanning, Contract Machining of Malleable Iron, Gray Iron, Wrought Iron and Steel. Galvanized Nails—Marine Hardware.

Digitized by Google

STOCKHAM PIPE & FITTINGS CO.

GENERAL OFFICE AND FACTORY: BIRMINGHAM, ALA.

DISTRIBUTING WAREHOUSES
BUSH TERMINAL, BROOKLYN, N. Y. 36TH AND IRON STS., CHICAGO

Manufacturers of Cast Iron Screwed Fittings, Flanged Fittings, Companion Flanges, Flange Unions and Drainage Fittings

CAST IRON SCREWED FITTINGS:



We make a full line of Cast Iron Screwed Fittings equally serviceable for steam, water, gas or air.

In "Standard" suitable for working pressures up to 125 pounds and "Extra Heavy" suitable for working pressures up to 250 pounds.

In straight and reducing sizes.

CAST IRON FLANGED FITTINGS:



Made in "Standard" suitable for working pressures up to 125 pounds and "Extra Heavy" suitable for working pressures up to 250 pounds. In sizes and designs to meet usual demands. Elbows, Tees, Crosses, Laterals, Etc.

CAST IRON DRAINAGE FITTINGS:



Made to meet every requirement of Cast Iron Fittings in drainage work. Elbows, Tees, Ty's, Y Branches, Increasers, Traps, Etc. Very complete range of sizes to meet the plumbing codes of all principal cities.

CAST IRON FLANGES:



Made in "Standard" suitable for working pressures up to 125 pounds and "Extra Heavy" suitable for working pressures up to 250 pounds. Straight, Reducing and Eccentric Patterns.

CAST IRON FLANGE UNIONS:



Made in "Standard" suitable for working pressures up to 125 pounds, and "Extra Heavy" suitable for working pressures up to 250 pounds.

For complete range of sizes and dimensions on all "S" Fittings write for our catalogue and other data.

Special Fittings made to order. Prices quoted from drawings submitted.

Galvanizing—We use the best grade of Western Spelter and in accordance with the best processes.

"S" Fittings made of Semi-Steel to order.

Digitized by Google

READING VALVE & FITTINGS CO.

READING DIVISION

READING, PA.

Manufacturers of Reading Open Hearth Cast Steel Flanged and Screwed Fittings, Flanges and Special Headers, Manifolds, etc.

BOSTON	HARTFORD	NEW YORK	PHILADELPHIA	PITTSBURGH	READING
CHICAGO	DETROIT	ST. PAUL	SAN FRANCISCO	CLEVELAND	HOUSTON

READING STANDARD OPEN HEARTH STEEL FITTINGS (Flanged and Screwed):



Are guaranteed for 250 lbs. steam working pressure and are tested to 1000 lbs. hydrostatic pressure before shipment. They are designed for all services for which extra heavy cast iron has been used in the past but are cast to standard cast iron dimensions. Sizes 1¼″ to 24″ in flanged and 1″ to 12″ in screwed fittings.

READING MEDIUM OPEN HEARTH STEEL FITTINGS (Flanged only):



Are guaranteed for 250 lbs. steam working pressure and are tested to 1000 lbs. hydrostatic pressure before shipment. As they are designed for replacement of extra heavy cast iron fittings in existing installations, the face to face and center to face dimensions, the diameter of flange and bolt circle and the bolting are the same as for extra heavy fittings but the thickness of flange and metal wall are the same as standard fittings. Sizes 2″ to 24″.

READING EXTRA HEAVY OPEN HEARTH STEEL FITTINGS (Flanged and Screwed):



Are guaranteed for 350 lbs. steam working pressure and a total temperature not to exceed 800 degrees F. Tested to 1200 lbs. hydrostatic pressure before shipment. They are particularly adapted for use in superheated steam installations, on high temperature pressure stills and in oil pipe lines. Sizes 1″ to 24″ in flanged and 1″ to 12″ in screwed fittings.

READING 800 LB. HYDRAULIC OPEN HEARTH STEEL FITTINGS (Flanged only):



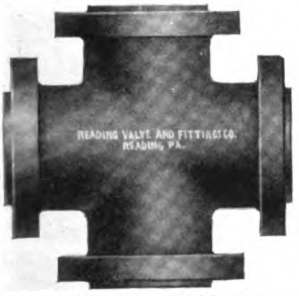
Are guaranteed for 800 lbs. working pressure when not subject to shock or for 500 lbs. working pressure when subject to shock. Tested to 1200 lbs. hydrostatic pressure before shipment. Particularly suitable for oil well service in the high pressure fields. Sizes 2″ to 24″.

Digitized by Google

READING VALVE & FITTINGS CO. READING, PA.

(READING DIVISION)

READING 1200 LB. HYDRAULIC OPEN HEARTH STEEL FITTINGS (Flanged only):



Are guaranteed for 1200 lbs. working pressure when not subject to shock or for 800 lbs. working pressure when subject to shock. Tested to 1800 lbs. hydrostatic pressure before shipment. Suited for oil field services running to the higher pressures, hydraulic machinery, etc. Sizes 2″ to 24″.

READING 3000 LB. HYDRAULIC OPEN HEARTH STEEL FITTINGS (Flanged only):



Are guaranteed for 3000 lbs. working pressure when not subject to shock or for 2000 lbs. working pressure when subject to shock. Tested to 4500 lbs. hydrostatic pressure before shipment. Adapted for high pressure hydraulic work of all kinds. Sizes 2″ to 24″.

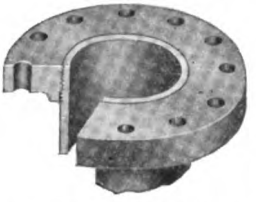
READING DOUBLE EXTRA HEAVY HYDRAULIC OPEN HEARTH STEEL FITTINGS (Screwed only):

For cold water or oil working pressures up to 6000 lbs. hydrostatic if shock is absent or so slight as to be negligible. Sizes ⅜″ to 2″.

READING OPEN HEARTH STEEL FLANGES:

SEE OUR ADVTS. IN MECHANICAL ENGINEERING THE JOURNAL OF THE A.S.M.E.

Companion, reducing and blind flanges cast for all



ranges of pressures and a total temperature not to exceed 800 degrees F. Companion flanges made of the screw, shrink or welded type. Faces of flanges finished smooth, raised face, male and female or tongue and groove, as desired.

READING OPEN HEARTH STEEL SADDLE NOZZLES:



Cast for all pressures in the design illustrated or with both flanges curved and with lugs for tie rods if desired. Flanges curved to fit any diameter of still, tank or boiler.

READING SPECIAL OPEN HEARTH STEEL FITTINGS:



Special headers, manifolds, bends or reducers cast to meet your requirements, according to your own drawings or to drawings prepared by the Design Division of our Engineering Bureau.

READING STEEL VALVES:

Steel gate valves, globe and angle valves, check valves, and automatic stop and check valves for all temperatures and pressures.

Write for catalogue describing fittings and flanges in detail.

Digitized by Google

BARCO MANUFACTURING CO.

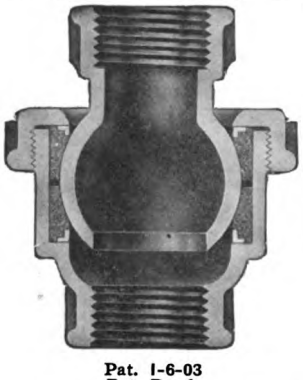
CHICAGO, ILLINOIS

Manufacturers of Barco Flexible Joints and Crossheads and Crosshead Shoes
Power Reverse Gears, Automatic Smoke Box Blower Fittings

BARCO FLEXIBLE JOINTS:

These joints have now been on the market over twelve years, and are well known to engineers and users of flexible joints everywhere for their efficiency and durability.

We recommend them very strongly wherever a flexible connection is required for steam, air,



Pat. 1-6-03
Pat. Pend.

oils, gases and water, either under pressure or suction.

Barco Flexible Joints consist of three metallic parts and two non-metallic gaskets which surround the ball and prevent it from coming in contact with the other metallic parts, *i. e.*, the cap and casing. The gaskets offer a firm resisting



Straight Joint



Angle Joint

seat somewhat softer than the ball, but hard enough to keep perfect shape without disintegration. The fact that the gaskets are softer than the ball and conform to its surface accounts for the absolute tightness of the joints under all conditions, and the self-lubricating feature of the gaskets insures free, easy movement with minimum wear. They are interchangeable, or renewable at small cost, making the joint practically new. The gaskets are very durable and will last a long time

In steel mills for water-cooled doors and tracks.
On pile drivers.
Around coke ovens to replace rubber hose.
Laying pipe lines on pontoon or temporary bridges.
Expansion joints on pipe lines—large or small.
On sprinkler cars for electric railroads.
Loading and unloading oil lighters and barges.
Steam heating oil lighters and barges.
For vulcanizing presses.



Angle Joint
Angle Both Ends



Hexagon Male End Joint



Pat. Oct. 6, 1908

Barco Flexible Joints are made in any metal or materials in common use, but are regularly furnished in bronze and malleable iron in the screw ends, and cast iron in the flange ends. The bronze joints are recommended for the best service. Barco Malleable Iron Joints combine the greatest strength with the least weight. The metal and finish are the very finest, and the joints are treated by a process which makes them practically rustproof.

All joints are tested under steam pressure, or air pressure.

SOME OF THE USES OF BARCO FLEXIBLE JOINTS ARE:

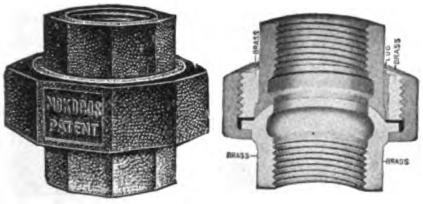
On steam shovels and dredges, and sand suckers.
Movable pipe lines in mines and quarries for rock drill and channeling machines.
Blowing off locomotives in railroad roundhouses.
Blower pipe arrangements in railroad roundhouses.
Connection between engine and tender for steam, air, crude oil and feed water.
Testing blocks of engine, pump and boiler manufacturers.
Steamships and engine rooms to take up expansion or vibration in steam pipe lines.
For pneumatic hoists and traveling cranes.
On steam brick presses.
In connection with steam irons.
On Lidgerwood unloaders.
Connection to rapid unloaders.
Laying pipe lines across rivers.
To replace rubber hose in cleaning boiler flues.
Steam syphons and piping service generally in mines.
Replacing rubber hose for heating cars at railroad terminals.
Connection to compressed air locomotives.

SEE OUR ADVTS. IN MECHANICAL ENGINEERING THE JOURNAL OF THE A.S.M.E.

Digitized by Google

ILLINOIS MALLEABLE IRON CO.

1801–25 DIVERSEY PARKWAY, CHICAGO, ILL.



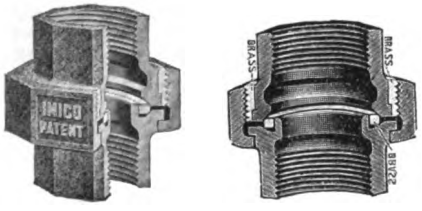
NOKOROS UNION (PATENTED):

The only union made absolutely non-corrosive at all contact points.

Non-corrosive brass to iron thread connection.

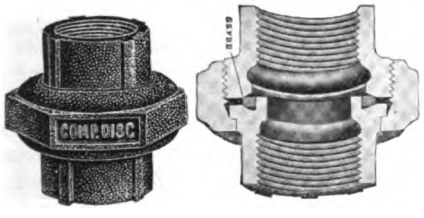
Non-corrosive brass to iron seat between ring and tail-piece.

Octagon shape, a monkey wrench will turn.



IMICO UNION (PATENTED):

New Imico unions are made of malleable iron, extra heavy, with bronze metal valve seat disc and non-corrosive ring connection.



C. D. RAILROAD UNION (PATENTED):

Heavy pattern malleable iron with brass valve seated disc. The face of each threaded section is beveled to receive a brass disc, and the connecting up of the union COMPRESSES the brass disc against the recesses, making a permanent steam metal seat.

NOKOROS UNION PRICE LIST

Size Inches	Price	
	Plain, each	Galvanized, each
⅛	.30	.45
¼	.30	.45
⅜	.40	.60
½	.50	.75
¾	.60	.90
1	.80	1.20
1¼	1.20	1.80
1½	1.60	2.40
2	2.00	3.00
2½	3.20	4.80
3	4.80	6.50

IMICO UNION PRICE LIST

Size Inches	Price	
	Plain, each	Galvanized, each
¼	.30	.45
⅜	.40	.60
½	.50	.75
¾	.60	.90
1	.80	1.20
1¼	1.20	1.80
1½	1.60	2.40
2	2.00	3.00

C. D. RAILROAD UNION PRICE LIST

Size Inches	Price	
	Plain, each	Galvanized, each
⅛	.30	.45
¼	.30	.45
⅜	.40	.60
½	.50	.75
¾	.60	.90
1	.80	1.20
1¼	1.20	1.80
1½	1.60	2.40
2	2.00	3.00

Also manufacturers of malleable and cast iron fittings.

Write for catalogue.

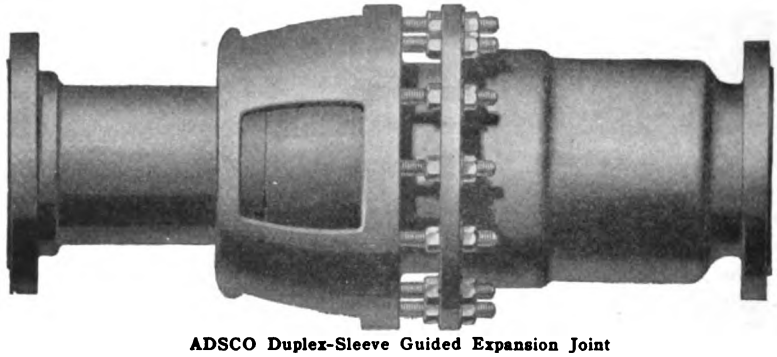
Digitized by Google

AMERICAN DISTRICT STEAM CO.

GENERAL OFFICES AND WORKS: NORTH TONAWANDA, N. Y.

NEW YORK CHICAGO SEATTLE

Manufacturers of equipment and devices for use in the underground and interior distribution of steam and of the specialties used in the ADSCO System of Atmospheric Steam Heating



ADSCO Duplex-Sleeve Guided Expansion Joint

ADSCO Duplex-Sleeve Guided Expansion Joint with Air-Cooled Sleeve:

An absolutely new expansion joint for high pressure and superheated steam de-
242 signed to reduce to a minimum troubles heretofore experienced with expansion joints for high pressure service. The design of this fitting should appeal strongly to all steam engineers.

The duplex sleeve allows a constant circulation of air between the inner and the outer sleeve, keeping the temperature of the outer sleeve about 35% lower than the inner. The packing of the slip is against the outer sleeve. Consequently the life of the packing is greatly prolonged.

The air-cooled slip is perfectly guided in its traverse, insuring an absolutely straight and true thrust of the slip into the body of the expansion joint, a very important feature.

The outer slip is, in all cases, of steel, accurately machined and ground. Bodies for extra-heavy pressures and superheat are of steel.

Can be furnished with either flanged or beveled ends; with or without anchors.

WRITE FOR PRINTED MATTER describing the new Expansion Joint in detail.

We also manufacture ADSCO brass sleeve Expansion Joints in

Single or double type

With or without service openings

With or without anchorage saddles

For high and low pressures and for superheated steam.

Let us quote on your requirements for any material used in connection with Underground Steam Main Construction, or for the distribution of steam for any purpose.

THIS COMPANY ALSO MANUFACTURES:

Steam Pipe Casing
Variators
Valves
Manhole Curbs
Flanged Fittings
Companion Flanges
Separators
Angle Fittings
Steam Traps
Meters for Steam or Liquids
Regulators
Heaters

Have You Buildings to Heat?

If you are interested in the economical heating of a community or group of buildings from a single steam-generating plant, ask for *Bulletin No. 20* on Central Station Heating and for *Bulletin No. 150*—describing the Adsco System of Atmospheric Steam Heating. This system can be installed for 15 to 20% less than most other heating systems and effects a saving in fuel cost of 25 to 30%.



ADSCO Double Expansion Joint Iron Body—Heavy Brass Slips. Model D Flanged

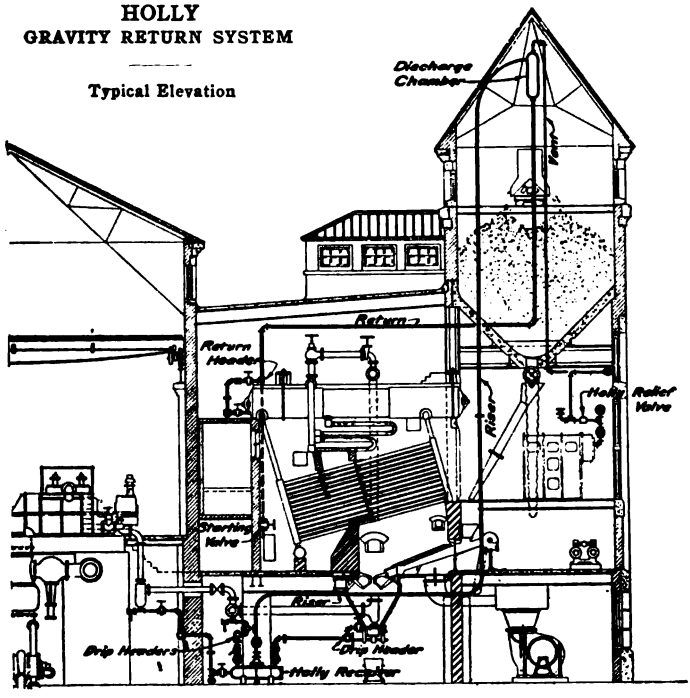
Digitized by Google

RUSSELL B. HOBSON

NEW BRIGHTON, NEW YORK

HOLLY
GRAVITY RETURN SYSTEM

Typical Elevation



Service:

The Holly Gravity Return System receives and returns to the boilers condensation from the main steam piping under any initial pressure of from 50–350 lbs. per square inch.

It forms a low, dry pocket, pulling the condensation out of every part of the steam piping or apparatus to be drained and throwing it back into the boiler so rapidly that it enters almost at the full boiler temperature.

Capacity:

The Holly System never tires. It is the watch dog of the power plant, and whether there is much or little to do, it stands ready to perform at its full capacity of many thousands of pounds per hour.

Effectiveness:

Its effectiveness is best attested to by the satisfaction expressed by its users. Through their courtesy we can show you many examples.

Efficiency:

The Holly System is most efficient because:

1. It discharges direct to the boiler at full temperature.

2. It is a closed system, and for this reason prevents the possibility of loss from leakage.

While we are now equipping several of the newer types of power plants with Holly Systems, we have also a fruitful field in old plants, where by its use very material economies are to be effected, particularly with the existing high prices of fuel.

Consult us and let us quote you.

Digitized by Google

JOHNS-MANVILLE

Incorporated

NEW YORK CITY

Branches in 64 Large Cities

Asbestos and Magnesia Products **Power Plant Specialties**

JOHNS-MANVILLE SERVICE TO POWER-USERS:

Reduces the expense of plant maintenance. Acts through power conservation right back to the ultimate reduction of your bills for fuel and labor.

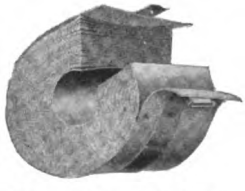
Johns-Manville Service embraces a complete line of maintenance materials designed to save heat, friction, wear and labor. The service rendered by each of these products is assured by Johns-Manville Responsibility, a business principle that places the user's satisfaction above all other considerations.

JOHNS-MANVILLE INSULATIONS:

One of the most important results of the development of Asbestos by Johns-Manville has been the saving of heat through insulation. Johns-Manville has developed materials, built on asbestos as a base, that retard the escape of heat from boilers, furnaces, pipes and flues.

Heat Insulations:

Asbesto-Sponge Felted Insulation (sectional, sheets and blocks). 85 Magnesia Insulation (sectional, sheets and blocks). Asbestos Fire-Felt Insulation (sectional, sheets and blocks). Thermo Fire-Felt Insulation (sheets and blocks). Vitribestos Insulation and Stack Lining (sheets). Asbestocel Insulation (sectional, sheets and blocks). Air-Cell Insulation (sectional, sheets and blocks).



Johns-Manville Asbesto-Sponge Felted Pipe Insulation

Cold Insulations:

Brine and Ammonia Pipe Insulation (built-up). Anti-Sweat Insulation (sectional). Zero Insulation (sectional).

JOHNS-MANVILLE PACKINGS:

Piston leaks and flange losses are not only nuisances but costly ones. Shutdowns are worse, because production stops while expense goes on. So that of all the ways Johns-Manville serves the power-user, none is more important than this function of decreasing maintenance costs through efficient packings.

Long life and service are obtained from Sea Ring Packing, because, by preventing unnecessary pressure and friction between Rod and Packing, needless wear is eliminated. Leakage is prevented because the flexible lip readily conforms to the action of the rod or plunger.

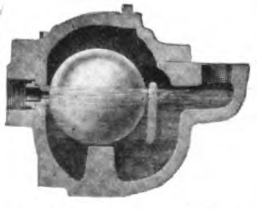


Johns-Manville Sea Ring

Sea Rings—for rods and plungers.
Universal—for pistons.
Mogul—for valve stems and small rods.
Kearsarge Boiler Gaskets.
Service Sheet and Gaskets—for flange packing.

JOHNS-MANVILLE STEAM TRAP:

Only three parts—the body, the rolling ball and the discharge bushings. Nothing to get out of order. The operation of the Johns-Manville Trap is positive and simple. It depends entirely upon the amount of water flowing to the trap.



Johns-Manville Steam Trap

The ball is held against the flat surface of the discharge bushing by the pressure in the system. Water flowing into the trap acts as a force which raises or rolls the ball upward and exposes part or all of the outlet orifice. The ball rises and falls according to the quantity of condensation coming to the trap, and the flow from the trap is regulated accordingly.

JOHNS-MANVILLE POWER PLANT SPECIALTIES:

Asbesto-Metallic Friction Blocks
Refractory Cements
Monolithic Baffle Walls
Aertite Boiler Wall Coating
Stack Preservative
Vulcabeston Pump Valves

Digitized by Google

MAGNESIA ASSOCIATION OF AMERICA

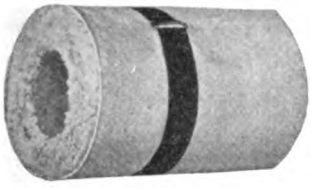
BULLETIN BUILDING, PHILADELPHIA, PA.

Executive Committee of the Association

WILLIAM A. MACAN, *Chairman*

GEORGE D. CRABBS	The Philip Carey Co.	Cincinnati, Ohio
ALVIN M. EHRET	Ehret Magnesia Mfg. Co.	Valley Forge, Penna.
J. R. SWIFT	The Franklin Mfg. Co.	Franklin, Penna.
R. V. MATTISON, JR.	Keasbey & Mattison Co.	Ambler, Penna.

"85% MAGNESIA" PIPE AND BOILER COVERING:



Product: "85% Magnesia" is an inorganic, inert mineral composition, composed of eighty-five per cent of commercially pure carbonate of magnesia, with which is incorporated sufficient mineral fiber to act as a binder, thus giving the necessary structural strength.

"85% Magnesia" is not a patented or proprietary product which any one manufacturer controls. Its established efficiency as a heat-conserving material is such that a number of manufacturers are engaged in producing it. This competition maintains a high standard of product and service.

Nature: It consists of myriads of microscopic crystalline cells, each one holding enmeshed an infinitesimal particle of *dead air*—the only accepted, scientific, principle of perfect heat-insulation.

Application: "85% Magnesia" is manufactured in the form of half *sections*, for pipes up to 10″ in diameter, *segments* for larger-sized pipes and curved surfaces, *blocks* for boilers and flat surfaces, and *plastic* (or fibrous powder) for irregular surfaces, filling of joints, etc.

Free Handbook: A practical handbook, "*Defend Your Steam*," dealing fully with the manufacture, uses, and application of "85% Magnesia" coverings and with the theory and practice of Heat Insulation.

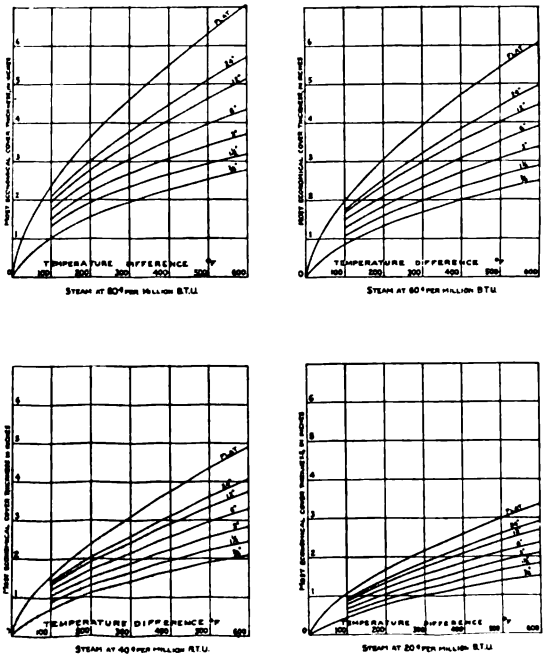
Specifications: Also a standard specification revised in accordance with latest information, for the application of "85% Magnesia" coverings.

Efficiency: The following graph shows the most efficient use of "85% Magnesia" coverings.

Thickness of "85% Magnesia" for Maximum Net Saving

For use in Plants where Heat-Costs, Steam-Temperatures, etc., are accurately known

These curves are based on the latest determination of fact arrived at by the Mellon Institute of Industrial Research



Digitized by Google

EVER-TYTE PISTON RING DIVISION

WALTER A. ZELNICKER SUPPLY CO.

1600 KINGSLAND AVE., ST. LOUIS, MO.

Manufacturers of Piston Rings

ZELNICKER Ever-Tyte PISTON RINGS are the result of 9 years' development and the expenditure of $1,000,000.00.

They are composed of three separate components, so proportioned that they have equal strength, the gaps in the three components, being located exactly 120° apart, thus assuring equal circular expansion and uniform radial wall pressure. The three components are interlocked by means of the patented right-angle interlock, thus permitting them to be handled with all the ease of a one-piece ring and at the same time reducing the side wear on the piston grooves. All rings made from a special grade of cast iron and machined to a high degree of accuracy, thus eliminating loss of compression even under highest temperatures encountered in any type of unit and preventing sticking together of components from carbonization of fuel or lubricating oils. Because of extreme flexibility of members, rings readily adapt themselves to worn or out-of-round cylinders and at the same time operate at reduced wall pressure, thus reducing the wall friction and friction of inertia.

FAYETTE R. PLUMB INC.

PHILADELPHIA PLUMB ST LOUIS

Sept. 10, 1920.

The Ever-Tyte Piston Ring Co.,
St. Louis, Mo.

Gentlemen:-

We have had excellent success with your rings working under steam, air and gasoline. It has been a pleasure to recommend them to our friends.

Yours very truly,
FAYETTE R. PLUMB, INC.
C Q Barrow
Chief Engineer.

ZELNICKER Ever-Tytes give equally good service in automobiles, compressors, pumps, locomotives, tractors, trucks, motorcycles, fire-engines, boats, aeroplanes, pulmotors, ice machines, and all types and sizes of units operating under steam, gas, gasoline, kerosene, fuel oil, air, ammonia, etc., by such nationally known concerns as—

AMERICAN BRIDGE CO.
AMERICAN BEET SUGAR CO.
BOOTH FISHERIES CO.
CHESTNUT AND SMITH CORP.
GENERAL NECESSITIES CORP.
GILLETTE SAFETY RAZOR CO.
IOWA GAS AND ELECTRIC CO.
MADISON COAL CORP.
STANDARD OIL COMPANY
F. B. WILLIAMS CYPRESS CO.

Put your compression problems up to us. We are PISTON RING ENGINEERS.

SEE OUR ADVT. IN MECHANICAL ENGINEERING

Digitized by Google

THE PICKERING GOVERNOR CO.

PORTLAND, CONN.

Manufacturers of Governors for Steam Engines and Turbines, Gas Engines, Mechanical Control and Speed Limit

THE PICKERING GOVERNOR:

Owing to the absence of joints our Governors are very responsive to slight changes in load, moving quickly and positively into correct position for maintaining the admission of steam proportionate to the duty required of the engine. Absence of joints gives maintenance in efficiency under continued and severe duty.

Greatest range in speed adjustment with close regulation at all points.



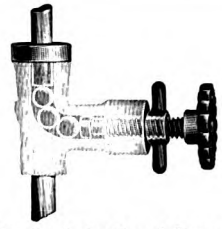
Fig. 33

Class B represents Governor with Speed Ranger by use of which the Speed of Engine can be varied while in motion. Sawyer's Lever is also included.

All Governors equipped with Wide Range Speed Changer.

U. S. A. & Foreign Patents.

We build to meet special conditions whenever practical and are pleased to submit suggestions on request.



Detail of the Speed Ranger

Fig. 34

Class A, to which is added the Automatic Safety Stop. This Stop closes valve when belt breaks or runs off pulley, and is simple and certain in its action.



Pickering is standard for specifications in steam practice the world over.

PICKERING TRADE MARK (REGISTERED)

We offer our services with over fifty years' successful experience.

TABLE OF DIMENSIONS, ETC., FOR CLASSES A AND B

Size of Governor Diameter of Opening	1¼"	1½"	2"	2¼"	2½"	3"	3½"	4"	4"½	5"	6"	7"	8"	9"	10"
Dia. of Base Flange.....	Scrd or 4½	5	6	7	7	7½	8½	9	9¼	10	11	12½	13½	15	16
Dia. of Side Flange.....	Scrd	Scrd	Scrd	7	Scrd or 7	7½	8½	9	9¼	10	11	12½	13½	15	16
From Cen. to Side Flange...	3	3½	3⅞	4¼	4½	5	6	6½	6½	7½	8	8½	9½	11	11¾
Base to Center of Inlet.....	3¼	3⅝	4¼	4½	5⅛	5½	6¼	7½	7⅜	8	8½	9	10	11½	11¼
From Cen. to End of Brg...	6¼	8	8	9⅛	9⅛	10⅜	10⅜	12⅛	12⅛	12¾	12¾	12¾	15½	15½	15½
Extreme Height.....	20¼	24	25⅛	27¼	27¾	32¼	34	41⅛	41⅛	46½	49⅛	49⅜	54	59	61
Greatest Exp. of Balls.....	7	8	8	9	9	10	10	13	13	15	16½	16½	18	20	20
Speed of Gov'r Shaft.....	350	380	380	300	300	340	340	320	320	275	275	275	260	260	225
Dia. Pulley on Gov'r.....	2½	3½	3½	4	4	4	4	5	5	5	6	7	7	8	8
Width of Belt.....	1¼	1½	1½	2	2	2	2	2½	2½	2½	3	3	3	3	3
Dia. Cyl. 300 ft. P'n. Sp...	6	7	9	10	12	14	16	18	20	22	26	31	36	40	45
Dia. Cyl. 400 ft. P'n. Sp...	5	6	8	9	10	12	14	16	18	20	23	27	31	35	39
Dia. Cyl. 500 ft. P'n Sp...	4½	5	7	8	9	10	12	14	16	18	21	24	28	31	35
Dia. Cyl. 600 ft. P'n. Sp...	4	4½	6	7	8	9	11	13	15	16	19	22	25	28	32

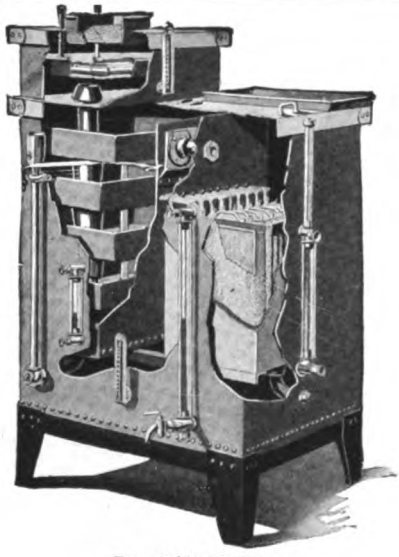
For complete table and for sizes below 1¼—see our general catalogue.

Digitized by Google

THE RICHARDSON-PHENIX CO.

126 RESERVOIR AVE., MILWAUKEE, WIS.

Lubrication Engineers and Manufacturers of Lubricating Apparatus and High Grade Valves



Type "A" Oil Filter

LUBRICATION NEEDS OF ALL MACHINERY:

Steam Turbines

Steam Engines

Pumping Engines

Diesel Engines

Gas Engines

Hydraulic Turbines

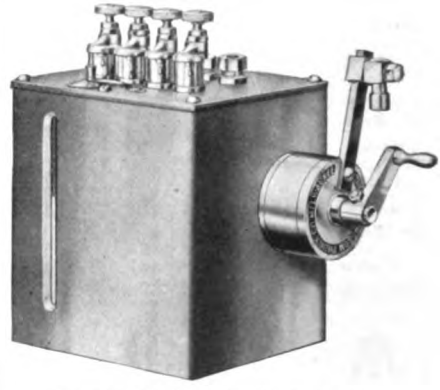
Ammonia Compressors

Air Compressors

Power Plant Auxiliaries

Marine Engines

Machine Tools



Model "T" Force Feed Lubricator

OIL PURIFICATION SYSTEMS FOR ALL INDUSTRIES:

Sugar Mill Machinery

Paper Mill Machinery

Cement Mill Machinery

Saw Mill Machinery

Rolling Mill Machinery

Mining Machinery

Steam Hammers

Rock Crushers

SEE OUR ADVTS. IN MECHANICAL ENGINEERING THE JOURNAL OF THE A.S.M.E.

Bulletins on All Our Products on Request

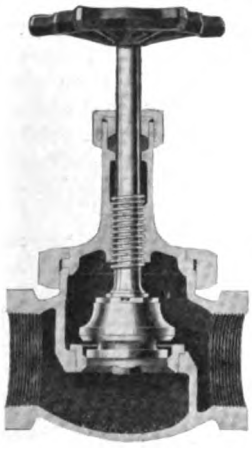
PIONEERS

IN SCIENTIFIC LUBRICATION

Digitized by Google

THE RICHARDSON-PHENIX CO. MILWAUKEE, WIS.

NOKUT BRASS AND STEEL VALVES:



NoKut Globe Valve

NoKut Brass Valves are designed for long life under severest service. Available in all types—Globe, Angle, Cross, Check, Regulating Check, Stop and Check; in screwed and flanged ends, screwed and bolted yokes. The Nokut principle absolutely prevents wire-drawing and erosion of seating surface by gases or liquids.

NoKut Steel Vales: Latest American electric steel, Monel trim valve designed especially for high-pressure, high superheat service. No wire-drawing, no differential expansion at seat ring, no distortion. Casting of unusual excellence. Qualities and performance of these valves have been demonstrated in leading, modern public utility power plants.

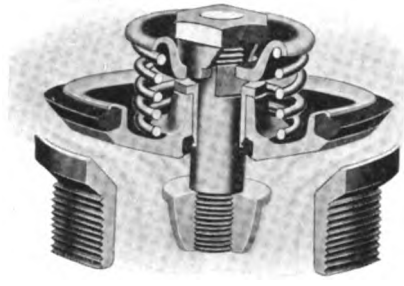
Nokut valves are not sold through jobbers, but direct to users, who get the price advantage.

Write for R-P NoKut Valve Book HC-20.

NOKUT PUMP VALVE:

Correct in engineering design in every detail. Study it.

Pronounced by competent engineers the best designed, most efficient and durable pump valve in the world.



NoKut Pump Valve

NoKut pump valves, standard or pot type, are suited to any pump. They are being universally adopted by foremost engineers. Metal to metal seat, composition sealing rings; may be taken apart without a single tool.

For pumping engines in water works, mines, industrial hydraulic service, no other pump valve will give the same service per unit of cost. These valves have practically a straight-line flow through them, minimum inertia, large port area with low lift; cannot chip, erode or distort. Sealed tight against leakage, preventing even the slightest slippage. The composition sealing rings take the wear and are renewed for a few cents each.

The performance of this valve in various kinds of severe service shows that it outlasts many times all other pump valves —unqualifiedly, unreservedly.

NoKut Booklet on request.

Digitized by Google

GREENE, TWEED & CO.

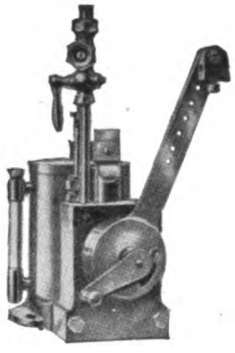
Established 1863

109 DUANE ST., NEW YORK

Manufacturers of Rochester Automatic Lubricators, Palmetto and Manhattan Packings, Wrenches, Belt Fasteners, and Other Mill Supply Specialties

ROCHESTER AUTOMATIC LUBRICATORS:

For the lubrication of the cylinders of all types of Steam Engines and Pumps and Air and Ammonia Compressors.



Each feed regulated independently. Not affected by temperature, pressure or vacuum.

Working parts are made of steel, and all bearings case-hardened.

All sizes are fully nickel plated.

Equipped with Multiplus Sight Feeds and vacuum and check valves.

The mechanism of the Rochester Automatic Lubricator is compactly centered in a steel pump block, the principal working parts being enclosed and protected from dirt, grit, etc.

This block with all the mechanism can be almost instantly detached and removed, giving easy access to all the working parts for cleaning, repairing, etc., without disturbing the bowl or reservoir attached to the engine.

The Clutch Drive, while positively noiseless, is absolutely positive.

Notwithstanding the fact that the drive is a clutch drive, there is a regulating device whereby more or less lost motion of the actuating arm can be caused.

The Clutch Drive Rochester is especially adapted for use on high speed engines, having been used with great success on an engine running at 800 r. p. m.

Can be furnished in the ratchet drive model, if desired, at an advance of $2.00 in the list prices.

No expense has been spared in the manufacture of Rochester Automatic Lubricators, efficiency and high quality being our aim rather than low prices.

PRICE LIST

For Stationary and Marine Engines and Pumps

1 Pint Single Feed	$25.00
2 Pint Single Feed	30.00
3 Pint Single Feed	35.00
½ Gallon Single Feed	40.00
1 Gallon Single Feed	45.00
2 Pint Double Feed	45.00
3 Pint Double Feed	50.00
½ Gallon Double Feed	55.00
1 Gallon Double Feed	60.00
2 Gallon Double Feed	75.00
½ Gallon Triple Feed	70.00
1 Gallon Triple Feed	80.00
2 Gallon Triple Feed	90.00
½ Gallon Quadruple Feed	90.00
1 Gallon Quadruple Feed	100.00
2 Gallon Quadruple Feed	105.00
2 Gallon Quintuple Feed	120.00
2 Gallon Sextuple Feed	130.00
2 Gallon Septuple Feed	140.00
2 Gallon Octuple Feed	150.00

Advance these list prices $2.00 for the Ratchet Drive Model.

For Air Compressors and Ice Machines

3 Pint Double Feed Two-Compartment	$55.00
1 Gallon Double Feed Two-Compartment	65.00
1 Gallon Triple Feed Two-Compartment	85.00
1 Gallon Quadruple Feed Two-Compartment	105.00

Advance these list prices $2.00 for the Ratchet Drive Model.

SEND FOR DISCOUNT.

SEE GUARANTEE IN MECHANICAL ENGINEERING

Digitized by Google

ADAM COOK'S SONS

Established 1868

708–10 WASHINGTON ST., NEW YORK

Manufacturers of Lubricating Oils and Greases



A MARK
Known and Respected around the world
—Since 1868—
for fair dealing a quality product and an unexcelled service

PRODUCTS:

Albany Grease, Cook's Lubricant, Cook's Cup and Extra Cup greases and Albany Lubricating Oils. Made in all grades to meet regular and special requirements, purposes and conditions.

ALBANY GREASE:

Is a pure lubricant so compounded that it automatically maintains a film of oil between rubbing surfaces, reducing friction losses to a minimum. It contains no adulterants and is guaranteed not to oxidize or gum or corrode the metal of the bearings. Made in different consistencies to meet different temperature conditions.

Comparative tests made by Horace W. Gillett, A.B., Ph.D, at Cornell University of Albany Grease with other well-known lubricating greases using the Thurston and Olsen Machines, showed results which may be summed up as follows:

1st—Greases with a low melting point and with a low content of soap, should theoretically be the most efficient.
2nd—Tallow greases, of which Albany Grease is the best known and most widely used, are the only ones having a low melting point and a low soap content.
3rd—Albany Grease (a pure tallow compound) consistently showed its superiority to the other so-called mineral greases, compounded from mineral oil and lime soaps, not only at one pressure on the bearing, but at all pressures.

Albany Grease can be used in any kind or style of grease cup and will not gum, cake, clog, or corrode.

It is economical because it stays where you put it and does not run or leak away. When the machine is not in operation, Albany Grease does not flow. It will flow just enough to give perfect lubrication—no more. These are facts that you should bear in mind when buying a lubricant.

Albany Grease will show wonderful results on Line Shafting and Loose Pulleys, also on Steam, Gas, Gasoline or Oil Engine Main Shaft Bearings, Crank Pins, Eccentrics and Slides. On special machinery, such as Printing Presses, Shoe Machinery, Coal and Metal Mine Equipment, Sugar Machinery, Cotton, Woolen and Paper Mill Installations, Lumber Camp Machinery, Wood Turning, Sawing Machines and in Steel Mills, it gives the best of service. In fact, no matter what kind of machinery you have, Albany Grease will lubricate it so that it will operate perfectly, keeping it cool and easy running, and reducing depreciation to the minimum.

Albany Grease is made in seven different consistencies to meet various conditions and temperatures. Use the right consistency for your work and you will have absolutely no trouble.

COOK'S LUBRICANT:

A pure mineral oil compound for lubricating gears, chain belt drives, mine car axle bearings, motor car and truck transmission and differential gears. Cook's Lubricant will not "channel" clog or cake and is unaffected by high temperature. It is made in three grades or consistencies. *Soft* for general lubrication, car axle bearings, worm drives and in other places where soft lubricant is required; *medium* for chain belt drives, motor car transmissions, etc., and *hard* for the special need of the worm drives, differential or transmission gears and the like.

COOK'S CUP AND EXTRA CUP GREASES:

Are good mineral oil cup greases for general machinery lubrication. Are recommended for general machinery lubrication where Albany Grease is not essential or a less expensive lubrication is required.

ALBANY LUBRICATING OILS:

Are "all Pennsylvania" oils possessing a low carbon content and high lubricating qualities. Are used for all purposes for which an oil lubricant must be used, engine cylinders, splash or flood lubricating systems for machinery in general. Supplied in grades suited for particular service as desired—in 1 and 5 gallon cans, half barrels and barrels.

REPUTATION:

This firm has been manufacturing lubricants since 1868. Our brands are noted for their quality, honest efficiency and dependability.

SERVICE:

We invite your inquiries and are in a position to assist you in solving your lubrication problems. Samples and literature sent on request. We do not make the cheapest, but we do claim that there is none superior to "Albany."

Digitized by Google

TIDE WATER OIL COMPANY

11 BROADWAY, NEW YORK

Manufacturers of Petroleum Derivatives



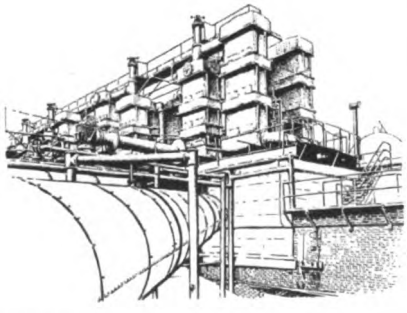
PRODUCTION:

The Tide Water Oil Company is producing oil from over 5,000 wells on 75,929 acres, comprising 731 properties, either owned in fee or under lease, located in eight states. 62,917 additional acres are awaiting development.

TRANSPORTATION:

The Company has 2,985 miles of trunk pipe lines to transport crude petroleum from the interior of the country to its great works at tide water.

Duplicate pipe lines, pumps and tanks make it possible to keep separate crude oils having special values for particular purposes, a feature exclusively Tide Water in its comprehensiveness.

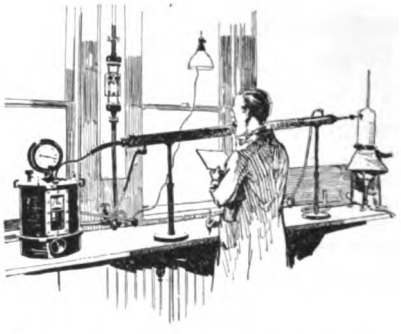


REFINERY:

The Tide Water refinery covers 175 acres and produces from 20,000 barrels of crude run daily, practically the entire range of petroleum derivatives. Its 150 different products are held at a uniformly high standard by an experienced operating organization guided by exact science. Economical operations are furthered by a completely equipped freight railroad; marine equipment; extensive lumber properties and saw mills; barrel factory; can manufacturing plant; chemical manufacturing and recovering plants.

LABORATORIES:

Tide Water Products are always made for a definite purpose. For each lubrication problem, for example, there is one



Tide Water oil or grease that the laboratories have determined by practical test and chemical analysis to be the best for the purpose. This particular product is always kept, by the same agencies, uniform in properties and quality.

MARKETING:

The domestic business of the Tide Water Oil Company reaches every state in the Union and every province in Canada, and its export business reaches practically every country in the world. All Tide Water Products are marketed in this country and Canada by the Tide Water Oil Company and its subsidiaries. Every Tide Water product is the best that a choice of raw materials, years of experience, constantly improved refinery equipment and scientific research can produce.

SHIPMENTS:

Unequalled shipping and packing facilities have been provided for prompt delivery of Tide Water Products. Private docks at the refinery in New York Harbor accommodate sea-going vessels. The Company owns and operates its own

Digitized by Google

TIDE WATER OIL COMPANY — NEW YORK, N. Y.

tank cars and bulk lighters as well as a considerable fleet of tank steamers.



Cans, drums and barrels are made in Tide Water's own plants to insure perfection of packaging, and Tide Water Products are shipped only in new containers, sealed and marked in a distinctive manner. Warehouses at many points insure prompt deliveries.

VEEDOL

Automobile, Motor and Transmission Oils and Greases

PRODUCTS:

Automobile oils
Automobile soap
Axle greases
Black oils
Bunker oil
Coke
Compound oils
Cup greases
Curve grease
Cutting oil
Cylinder oils
Dynamo oils
Engine oils
Fibre grease
Floor oil
Fuel oil
Gas oil
Gasoline (Tydol)
Graphite greases
Hair grease
Ice machine oils
Journal compounds
Journal greases
Kerosene
Lava compound (gear grease)
Machine oils
Marine oils
Motor oils
Pale oils
Paraffin oils
Petrola
Pine grease (rosin)
Pitch
Refined wax
Red oils
Road oil
Scale wax
Semi-fluid greases
Spindle oils
Transformer oils
Transmission oils
Transmission greases
Turbine oils
Wax tailings
White mineral oils
Wool grease
Wool oil
Wool stock

SERVICE:

The Tide Water Oil Company produces the best products of which its resources are capable.

The Tide Water Oil Company endeavors to give the best possible service to the consumer in connection with these quality products. Its salesmen are schooled to a thorough knowledge of Tide Water Products and their uses. They will give their best effort to the solution of each and every lubrication or other problem, and are prepared to call upon the laboratories and personnel of the Tide Water organization to aid them.

Digitized by Google

AMERICAN METALLIC PACKING CO.

N. S. PITTSBURGH, PA.

Manufacturers of Metallic Packings

AMERICAN METALLIC PACKINGS:

Made for packing any steam, air, gas, gaseous ammonia or gas engine rods working under any conditions or pressure, whether high or low, condensing or non-condensing, or when using superheat. It is not used in connection with fibrous or rubber rings and is therefore an all metallic packing.

While we make many different styles of casings to suit all conditions, this space only permits the printing of one style and two types of rings we manufacture.

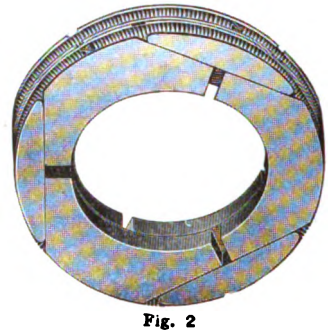


Fig. 2

Fig. 2 type 29 ring is our standard and can be used with any type of casing we make. It is recommended for all rods up to 16" diameter. It is truly a flexible ring and will work more satisfactory on tapered rods than anything to be had.

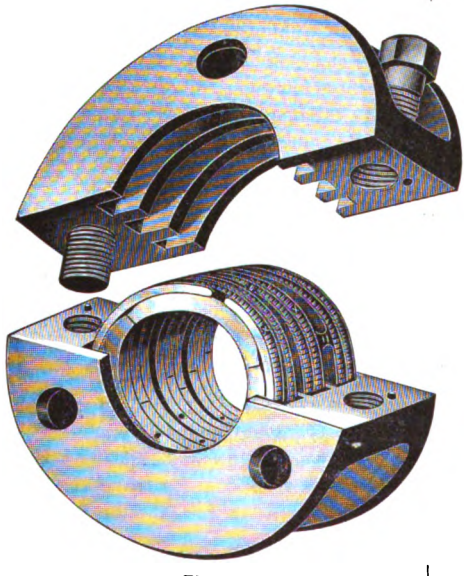


Fig. 1

Fig. 1 illustrates our best and most popular packing assembly. This is known as our outside split packing. It can be applied against the face of the stuffing box or to the face of the soft packing gland without having to disconnect any part of the engine This packing requires approximately 3¼" along the rod on 5" rods or less, and 4¼" on larger rods.

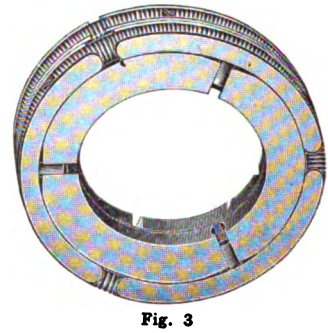


Fig. 3

Fig. 3 type 10 ring or better known as our old Walker type packing is the oldest sectional metallic ring on the market. It is still in great demand and we are showing it here for the benefit of those that are not familiar with it.

Guarantee—*We sell our packings on a ninety day free trial basis. When once applied to an engine it is to stay there for two years at our expense.*

American Metallic packings are used on the largest engines in the world.

Digitized by Google

FRANCE PACKING COMPANY

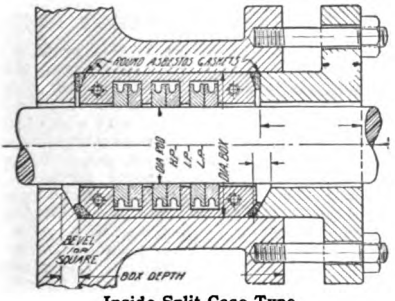
TACONY, PHILADELPHIA, PA.

Branch Offices in All Principal Cities

Manufacturers of Metallic Packing for All Conditions of Service

METALLIC PACKING FOR ALL CONDITIONS OF SERVICE:

Steam, Gas, Air and Ammonia



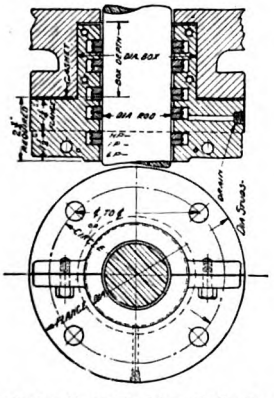
Inside Split Case Type
$12.00 per inch dia. of rod

France Metal Packing for steam, air, gas or ammonia is made of Vanadium Cast Iron—the best wearing metal known.

For superheated steam on Vertical Engine, Bronze or Bell Metal is used, depending upon the pressure.

The cases are made of cast iron.

The packing is designed for your engine and your conditions. It will last from 5 to 20 years. It is rented or sold on approval.



Marine Type Packing, Split Case
$15.00 per inch dia. of rod

This type of packing is used extensively on vertical and marine engines. It is tapped for carrying off the water that may adhere to the rod also for lubrication when desired.

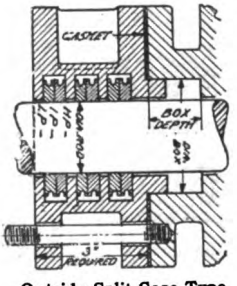
We guarantee satisfaction or expect no pay where the rods are not scored.

What our Steam Packing will pack:

France Metal Packing will pack any round steam, air, gas and gaseous ammonia rod, any pressure, speed or temperature. Any piston rod of any type of engine or pump, whether vertical or horizontal. It will pack any valve stem, whether reciprocating or oscillating.

What our Hydraulic Packing will pack:

It will pack any true pump rod, plunger or valve stem pumping any kind of liquid, no matter what the pressure or temperature. Any elevator rod or plunger. Any rod working in liquid.



Outside Split Case Type
$13.00 per inch dia. of rod

Furnished where stuffing box will not admit of inside type.



$1.50 per lb.

Tip Top Shredded Metallic Packing is used on stop valve stems and small piston rods and valve stems, etc.

It is also compressed into rings and bars and is put up in two, five and ten lb. cans.

Send for catalog illustrating additional types.

SEE OUR ADVTS. IN MECHANICAL ENGINEERING THE JOURNAL OF THE A.S.M.E.

Digitized by Google

GOETZE GASKET AND PACKING CO.

11 ALLEN AVE., NEW BRUNSWICK, N. J.

Manufacturers of genuine Goetze Gaskets of various types, Goetze Metallic Packings, Goetzerit Sheet Packing, and Goetze Valve Discs

PRODUCTS:

Goetze No. 1 Corrugated Gaskets made of copper, brass, steel, monel metal, aluminum, lead, etc.

Goetzerit Sheet Packing 1/32", 1/16" and 1/2" thick, and Goetzerit Gaskets

Goetze Metallic Packing.

Goetze products are made to meet the special conditions incident to various industries. It is therefore important that we be advised of conditions.

Goetze No. 2 elastic corrugated copper gaskets with asbestos lining, also made of steel, aluminum, monel metal, lead, brass, etc.

Goetze valve gaskets or discs for Jenkins, Crane, and similar type valves.

Goetze Special Devo Gaskets corrugated metal with asbestos, non-corroding, covered with Goetze Special Cement.

Goetze Copper Asbestos or Steel Asbestos Gaskets for B & W, Heine, Franklin, Keeler, Edgemoor boilers, etc.



Goetze Devo



No. 1



Goetze Triumph



No. 2



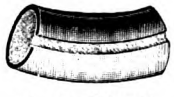
No. 22



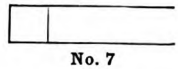
Goetze Triumph



No. 1a



Goetze Triumph



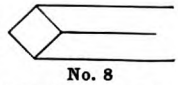
No. 7



No. 4



No. 12



No. 8

Goetze Gaskets are adaptable for the following uses:

SEE OUR ADVTS. IN MECHANICAL ENGINEERING THE JOURNAL OF THE A.S.M.E.

Acid lines	Handholes
Aeroplane motors	Heaters
Air and ammonia compressors	Locomotives
Alcohol lines	Manholes
Benzol and toluol stills	Oil engines
Boiler domes	Oil, hot or cold Pumps
Boilers, stationary	Steam and gas engines
Boilers, marine	Steam chests
Chemical lines	Steam hammers
Coke oven by-product plants	Steam shovels
Condensed water lines	Steam traps
Condenser joints	Stills and tanks
Cylinder heads	Submarines
Diesel engines	Superheaters
Distillers	Tractors
Economizers	Unions
Flanged joints	Valve bonnets
	Water tube boilers



GOETZERIT SHEETS AND GASKETS:

Goetzerit is a red asbestos sheet packing of quality, and therefore, much cheaper than other packings. Goetzerit is made from pure prime asbestos long fibre, compressed under exceedingly high pressure and impregnated with a substance which makes it proof against the action of superheated and saturated steam, air, gas, water, oil, ammonia, and various chemical services. It does not squeeze out into the pipe openings and will not blow out under high pressure. Goetzerit is recommended to the engineers who prefer to cut their own gaskets, who keep Goetzerit in stock ready for emergency cases. Never mind any unfortunate experiences you may have had with asbestos sheet packing, try Goetzerit under your own conditions on our ninety days' trial basis. We will let you be the judge.

GOETZE NO. 2 ELASTIC GASKET:



Goetze No. 2 Elastic Gasket is a very superior gasket, made from chemically pure copper and the best of asbestos. In other words it is a Copper-Asbestos Gasket, though quite unlike and better than most gaskets so named. The copper is corrugated and closely twisted asbestos is held in the corrugation as shown in the cut. The Gasket that holds tight against extremes of pressure and temperature and superheated or saturated steam. The Gasket that costs least by the year. The Gasket that's free if it fails. The Gasket that you may try for 90 days, under any conditions. That's Goetze No. 2—The Dependable—A Goetze Gasket—A product of long experience and unusual facilities. Try them out in your "Trouble Spots." Look for the Red Label with white letters, reading "Goetze No. 2 Elastic."

GOETZE VALVE GASKETS OR DISCS:



For valves of Jenkins type are made of copper and asbestos. They're resilient—full of "comeback"—always ready for business. They furnish a cushion for the valve seats which will yield just enough to make a tight joint, but which will not crumble, deteriorate, or injure the valve seats in the slightest degree.

If you are not yet using Goetze Valve Gaskets, send a sample order, large or small, on 90 days' trial. They don't cost you a cent unless they make good.

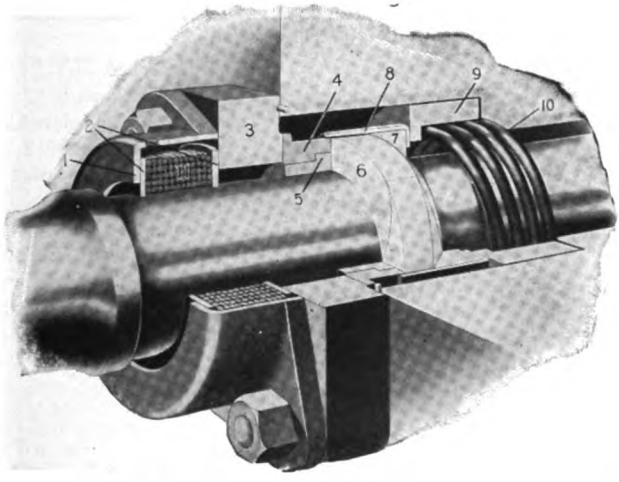
Digitized by Google

THE UNITED STATES METALLIC PACKING CO.

429 N. 13TH ST.,
PHILADELPHIA, PA.

BRANCH OFFICES: NEW YORK AND CHICAGO

Manufacturers of Metallic Packings for Locomotive, Marine and Stationary Engine Piston Rods and Valve Stems; also other Locomotive Appliances



King Locomotive Piston Rod Packing

KING PACKING:

For locomotive piston rods, valve stems and air pumps its simplicity, efficiency and economy have been demonstrated on a majority of the locomotives in this country. Designed and manufactured to meet the extreme requirements of modern railway service.

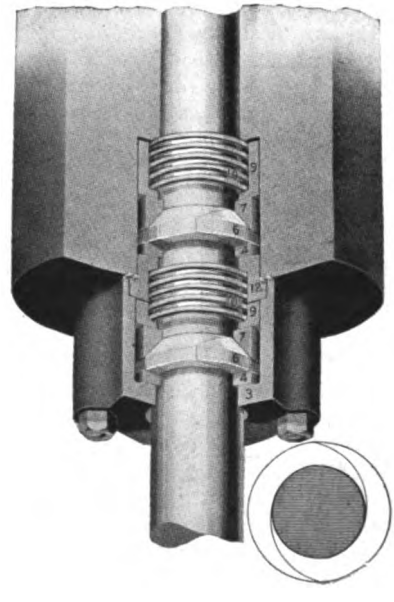
KING TANDEM PACKING:

For marine and stationary engines, any pressure.

We manufacture metallic packings for marine and stationary engines, varying the design to suit the conditions.

Send for catalog describing our metallic packings and other products.

"The maximum of service in the long run."



King Tandem Packing

Digitized by Google

THE B. F. GOODRICH RUBBER CO.

AKRON, OHIO

Offices in All Principal Cities

Manufacturers of Rubber Goods: Transmission Belts, Conveyor Belts, Elevator Belts; Hose for Steam, Water, Air, Oil, Gas, Acids, Etc.; Tubing; Packing for Pumps (Steam, Including Super-Heated), Oil, Water, Etc.; Matting; Pump Valves; Diaphragms; Molded Goods; Rubber Covered Rolls; Hard Rubber Goods; Rubber Footwear; Rubberized Fabric; Druggists' Sundries; and Solid, Pneumatic, Carriage and Bicycle Tires

The B. F. Goodrich Rubber Company, while manufacturing everything in rubber, can here only present in condensed form a few items of more particular interest to the mechanical engineer. Mechanical Rubber Goods includes everything made of rubber to be used in connection with mechanical equipment and this Company makes a specialty of each article for its particular use. While a few items and brands are mentioned, the engineer will find any specific article required has been worked out and his problem practically solved, if it is in rubber goods.

TRANSMISSION BELTING:

The advantages of rubber drive belt are based upon its proven merit in pulley adhesion, flexibility, imperviousness to water and oil, lack of stretch and long life. Its economy and superiority to earlier standard types is well established. We call attention of engineers to our phenomenal belt known as "COMMANDER."

For high speed, small pulley belts, like woodworking machinery, fans, centrifugal pumps, etc., use "MARATHON."

CONVEYOR BELTING:

In this field, rubber alone can be considered, particularly on account of the extra rubber cover required for abrasive materials. Flexibility, lack of stretch, straightness and straight running and durability are the watchwords back of the Goodrich constructions. Supreme merit has carried around the world the use of our superior product, "LONGLIFE."

ELEVATOR BELTING:

A service usually requiring rugged strength. The elevator belt must have a great tensile strength, body and grip for the bolts, and resist successfully snagging, breaking, moisture and abrasion. A specially developed construction combining the foregoing qualities, originally brought out for mining yet unsurpassed wherever wet and abrasive material is handled, is branded "NEW MINING ELEVATOR."

For handling stone and lump material in general work, use "AKRON."

GRAIN HANDLING:

Grain elevator service has always required a special type, and developments here have proven the superiority of rubber belts. Our development has particularly been the putting in of *aging quality* to withstand years of service. We have two special belts here for conveying and elevating, respectively, known as "CARIGRAIN" and "LEGRAIN."

A few special items interesting to the engineer in other fields, are "SANI-WHITE" for canneries, "SUMMIT" Endless Thresher Belts for farm power, "MAXECON" Grader Belts for grading and ditching machinery, and Endless belts (made without splice) for every service.

Digitized by Google

THE B. F. GOODRICH RUBBER CO. AKRON, OHIO

HOSE:

Rubber hose is astonishing in its varieties of constructions and uses. Garden Hose is familiar to all, but the engineer should particularly know the wonderful characteristics of steam hose, air brake hose, acid hose, suction hose, oil hose, to say nothing of fire hose. Goodrich has developed a superior article for each service.

Water Hose must withstand abuse, kinking, surface wear and high pressure. We have many brands, but recommend "COMMANDER" Water Hose.

Steam Hose must do wonders to stand up against high temperature and pressure and not harden, crack and separate. From Alaska to South Africa, we are famous for our "GOODRICH" Steam Hose.

The Pneumatic Tool and Air Drill presents its own problems of pressure, anti-crushing, oil resistance, etc., and is met by "COMMANDER" Pneumatic, and "GOODRICH" Air Drill.

Oil Suction and Discharge is a big problem with the oil companies, and oil resistance is one of the chief achievements of Goodrich rubber compounding. We point to the phenomenal performance of "No. 150" and "No. 350."

Fire Protection Hose for both municipalities and for mills, is of the utmost importance and it must not only be well constructed but able to withstand pressures and have aging quality. In this service, use "WHITE KING" for municipalities, "PLANET" Mill Hose for plant protection.

PACKING:

While seemingly unimportant, packing, especially where steam is present, is an important item in mechanical equipment. Leak-tight joints are not only necessary, but are a comfort in operation. A packing which will not blow out or crack, particularly with superheated steam, and will also be soft enough to be re-used, is a valuable asset. Goodrich packings are reliable, lasting and safe.

Sheet Packings, as used for gaskets, joints, etc., must be developed and selected for each particular application. For superheated steam, also on ammonia lines, use "No. 10 SUPERHEAT."

For general joints, water, steam, etc., use "AKRON" Red Sheet.

For oil lines (a place where ordinary rubber deteriorates) use "SUMMIT" Oil Resisting Packing.

For heavy duty work on plungers, followers, etc., use "B. F. G." Hydraulic Packing.

For packing rods against steam pressure, use "PINNACLE" Diagonal Fabric Packing.

PUMP VALVES:

Goodrich rubber pump valves are more important to the engineer than would at first be recognized. Our immense sales of these small items emphasize their value in mine work, pumping stations, municipal water plants, oil fields, boiler feed pumps, marine service, etc. Each service must be specially met by a particular compound, density, or character. Any requirements are met by our special 48-hour delivery service.

RUBBER COVERED ROLLS:

The use of rubber covered rolls is indispensable to many processes and Goodrich covering of rolls for paper mills, tanneries, textile plants, sheet and tin plate mills, and for printing presses, is worked out with equal proficiency and regard for service conditions.

MOLDED GOODS:

The number of small rubber parts used in connection with machinery is astonishing. Each piece, small or large, must be specially developed for its use and service. We are equipped with molds for all standard articles and can give prompt service in developing special items or in using customers' molds.

HARD RUBBER:

The items of particular interest to the engineer are hard rubber sheet, tube and rods. We are equipped to make these, and in fact, all classes of hard rubber goods.

Digitized by Google

NEW YORK RUBBER COMPANY

Incorporated 1851

34 READE ST., NEW YORK, N. Y.

HOUSTON, TEXAS, 805 FRANKLIN AVE. CHICAGO, 325 W. RANDOLPH ST.

Manufacturers of Mechanical Rubber Goods



"Dependable" No. 4 Conveying Authracite Coal

260 **"DEPENDABLE" CONVEYOR BELTING:**

Made with three grades of cover—for service in connection with materials of greater or lesser abrasive qualities. Constructed to eliminate sheering as far as is physically possible—edges protected against edgewear. "DEPENDABLE" Conveyors may be depended upon to deliver the goods.

Other brands—"GOLD DREDGE," "BLUE BIRD" and "STONORE"—the latter also offered in three grades of cover.

TRANSMISSION BELTS:

Triumph: Friction surface. Fancy belt for permanent installation where initial outlay is not deciding factor. It is worth the difference.

Wiccapee: Friction surface. Recommended for main and important counter drives. *It has stood the test of Time.* Its installation insures economical transmission.

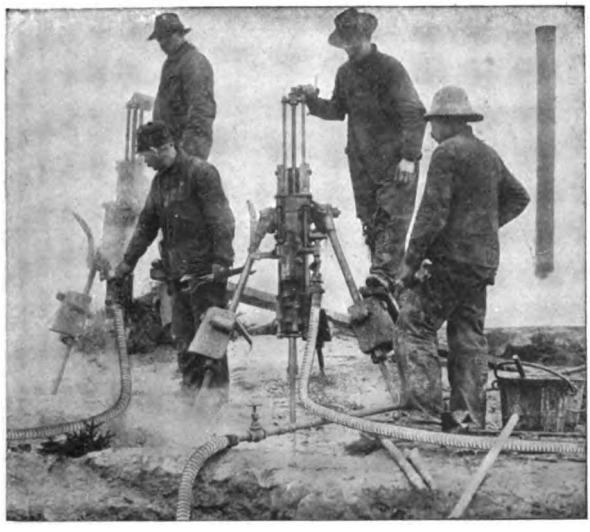
Our Extra: Friction Surface. A good belt for ordinary service. Excellent results obtained in the open, such as on agricultural machinery. etc.

Other Brands: "Tractor;" Friction Surface; "Special Elevator;" "Duchess Stitched;" "Stacker;" "Cameo;" and "Clinton" Brands.

We also make hogscraper belts, axle generator belts, as well as special belts for any particular service.

Digitized by Google

NEW YORK RUBBER COMPANY NEW YORK, N. Y.



"DUTCHESS" AIR DRILL HOSE:

A perfect balance of selected materials and the knowledge of combining them has produced this excellent air drill hose.

"DUTCHESS" STEAM HOSE:

Like "Dutchess" Drill Hose the "DUTCHESS" brand is the only hose we manufacture for this purpose. In service in all industries from coast to coast the natural assumption is it is abused as well as used without complaint. We unreservedly recommend Dutchess.

WATER HOSE:

Again it is "DUTCHESS" which is our first offering Higher pressures and service conditons more severe than ordinarily encountered are the proper settings for "DUTCHESS" Water Hose.

For ordinary conditions we offer the "CAMEO" Brand.

For out-door fire protection "BLUE BIRD" Rubber Fire Hose is unsurpassed. Flexible and strong, it carries the usual fire hose guarantee as to pressure and service.

We also manufacture dependable hose for pneumatic tool work, Suction, Rotary Drilling, Spraying, Chemical Fire Apparatus, Car and Engine connection, etc., etc.

Digitized by Google

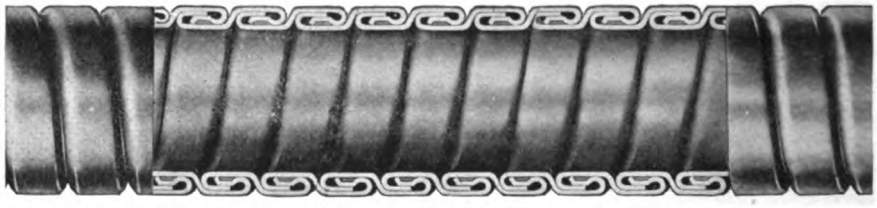
THE AMERICAN METAL HOSE CO.

WATERBURY, CONN.

Sales Offices: 84 Batterymarch St., Boston, Mass. 29 East Madison St., Chicago, Ill.
173 Lafayette St., New York City. Union Bank Building, Pittsburgh, Pa.

Canada:
Lytle Engineering Co., Limited,
Montreal, Canada

Pacific Coast:
F. Somers Peterson Co.,
San Francisco, Cal.



Section of ¾" I. D. Interlocked BD15 Hose
(Actual Size)
This style used for both Steam and Oil

A SUPER HOSE Suitable for all Heavy Duties, and Severe Services.

AMERICAN METAL HOSE is manufactured in several different patterns and can be used to advantage in practically any class of work. Primarily, however, it is a heavy duty, hard service proposition, and its remarkable efficiency and economy are most pronounced in those services where rubber hose can, at the best, last but a short time.

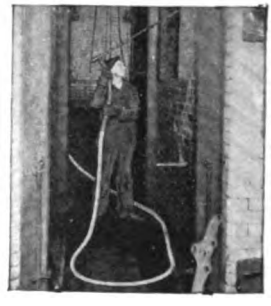
We particularly recommend our Hose for the conveying of Steam, Oils, Gas, Gasoline, etc.

The U. S. Navy, the largest consumer of heavy service hose in the country, is now using Flexible Metal Hose exclusively for both Oils and Steam.

Most Hose problems are really of a simple nature. No rubber hose can be made to stand up against the chemical action of Oils or the intense heat of Steam. Buy Flexible Metal Hose—a permanent Hose—in the first place, and you will get away entirely from the necessity of frequent replacements. The benefit of our 13 years' experience as manufacturers of Flexible Metal Hose is at the disposal of any one who is confronted with Hose problems of a technical nature.



Tank Car Unloading



Flue Blowing

Write us for full information—you will be surprised at the manifold advantages of using Flexible Metal Hose.

TEST TABLE: BD 15 FLEXIBLE BRONZE HOSE

Diameters of Hose, Inches		Approx. Bending Dia., In.	Wt. Per Foot Lbs.	Test Press. Lbs. per Sq. In.	
Inner	Outer			Straight	Bent
¼	11/32	4	.11	500	400
3/8	15/32	6	.25	500	400
½	21/32	7	.40	500	400
¾	1	12	.80	500	400
1	1 1/4	14	1.00	500	400
1 1/4	1 13/16	18	1.50	400	300
1 1/2	1 13/16	22	1.75	400	300
2	2 1/16	26	2.75	300	200
2 1/2	2 13/16	32	3.15	250	150
3	3 3/8	38	4.50	250	150
4	4 1/16	44	6.75	200	75
5	5 1/16	50	8.75	200	75
6	6 1/16	56	11.00	150	75

STEEL HOSE is approximately 10% lighter than Bronze.

(Above test pressures are from latest U. S. Naval specifications on flexible metal hose and are used by us as standard.)

Digitized by Google

Testing, Measuring and Recording Apparatus

EQUIPMENT CATALOGUED IN THIS DIVISION

Data begins on page number given, as closely as can be divided. Consult Directory Section (green pages) for specific products.

	PAGE
Ammeters	291
Calorimeters	284
Combustion (CO_2) Recorders	281
Controllers	291
Gage Testers	287
Gages, Draft	284
Gages, Pressure	287
Gages, Tank	297
Gages, Vacuum	287
Gas Analysis Apparatus	282
Indicators	281
Indicators, Engine	288
Laboratory Supplies	300
Liquid Level Recorders	293
Meters	273
Production Recorders	291
Pyrometers	291
Recorders	273
Regulators	291
Scales, Automatic	270
Tachometers	292
Testing Machines	265
Thermometers	291
Vibrometers	298
Voltmeters	291
Wattmeters	291
Weighing Machines	270

See next page for list of firms catalogued

CATALOGUE SECTION

PART II **Pages 263-300**

Digitized by Google

INDEX TO FIRMS CATALOGUED IN PART II

A

PAGE

Ashton Valve Co. 287

B

Bacharach Industrial Instrument Co. 279
Bailey Meter Co. 280
Biddle, James G. 298
Bristol Co. 291
Brown Instrument Co. 292
Builders Iron Foundry 277

C

Crosby Steam Gage & Valve Co. 288

D

Du Vivier, Ernest H. 270

E

Electric Tachometer Co. 299

F

Foxboro Co. (Inc.) 293

G

Griebel Instrument Co. 319

H

Hays, Jos. W. Corp'n. 282

L

Lonergan, J. E. Co. 289

M

Mono Corp'n. of America 283
Moto Meter Co. (Inc.) 294

N

National Meter Co. 273
Neptune Meter Co. 274

O

Olsen, Tinius, Testing Machine Co. 265, 266, 267

P

Pittsburgh Meter Co. 275
Pneumercator Co. (Inc.) 297
Precision Instrument Co. 284, 285
Pusey and Jones Co. 269

R

Reliance Weighing Machine Division 271
Republic Flow Meters Co. 281
Richlé Bros., Testing Machine Co. 268

S

Schaeffer & Budenberg Mfg. Co. 295
Simplex Valve & Meter Co. 278

T

Tagliabue, C. J. Mfg. Co. 296

U

Uehling Instrument Co. 286
Union Water Meter Co. 276
United States Gauge Co. 290

W

Willcox Engineering Co. 272

Digitized by Google

TINIUS OLSEN TESTING MACHINE CO.

500 NORTH 12TH ST., PHILADELPHIA, PA.

Manufacturers of Testing Machines and Instruments: Olsen-Carwen Static-Dynamic Balancing Machines

PRODUCTS:

Testing Machinery and Instruments for determining the physical characteristics of all material. Universal Testing Machines, Special Testing Machines for Hardness, Torsion, Impact, Bending and Alternate Stress Testing. Special Testing Machines for Cement, Concrete, Fabric, Cloth, Twine, Paper, Leather, Oils, Grease and Bearing Metal. Also Testing Machines for moulded insulating material, springs, wire, rope, chain, anchors, iron, steel, road materials, etc. Special Efficiency testing machines for determining the property of all tools. Special Milling Machines, Pumps, Viscosimeters, Presses, Accumulators, etc.

OLSEN CATALOGS:

We build several hundred types and sizes of Testing Machines applying to almost every conceivable class of material and have classified these machines according to their similarity and use in our catalogs and bulletins, as follows:

Part "A"—Universal Testing Machines and Instruments.
Part "B"—Spring Testing Machines and Spring Machinery.
Part "C"—Cement, Concrete, and Road Materials, Testing Machines.
Part "D"—Cloth, Yarn, Paper, Leather and Rubber Testing Machinery.
Part "E"—Wire, Rope, Chain, and Anchor Testing Machinery.
Part "F"—Oil, Grease and Bearing Metal Testing Machinery.
Part "G"—Transverse and Beam Testing Machinery, Foundry Testing Machines.
Part "H"—Special Testing Machines, including Impact Abrasion, Vibratory, Bending, Hardness, Endurance, Torsion, Alternate Stress and Efficiency Testing Machines.
Bulletin No. 1—OLSEN Hydraulic Brinell Hardness Tester.
ulletin No. 2—Rubber, Fabric, Oil, Grease, and Special Testing Machines.

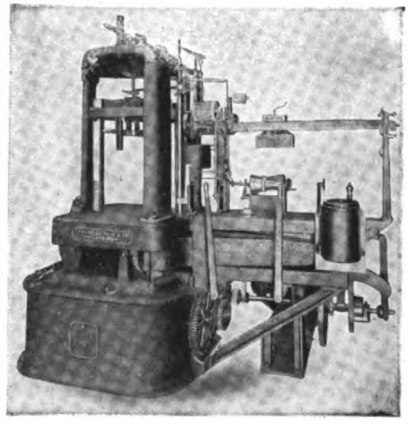
Any of the above catalogs or bulletins will be mailed upon request.

TESTING LABORATORY—Research Department:

We have a completely equipped Testing Laboratory and Research Department in which we are prepared to make all kinds of tests and investigations and develop new methods of testing and suitable machines for the purpose.

Special problems requiring the development of new methods of testing and new designs of Testing Machines are placed in the hands of expert Engineers who are trained in this class of work.

Olsen Universal Testing Machines:

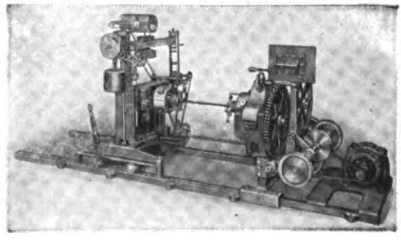


Olsen New Automatic and Autographic Universal Testing Machine

These machines are built in several types, and many degrees of completeness, and in sizes ranging from 10,000 lbs. to 1,500,000 lbs. to meet almost any and every requirement.

Testing machine as shown is an illustration of our most complete up-to-date machine, used by all the large well-equipped Metallurgical and Automobile Testing Laboratories.

Olsen Torsion Testing Machines:



230,000 Inch Lbs. Capacity OLSEN Autographic Torsion Testing Machine

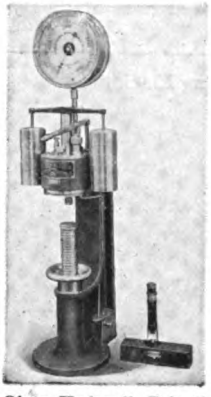
This size machine is in use by all the large Automobile Manufacturers. Such machines are made in many sizes varying from that testing a small wire, to that of 2,000,000 inch lbs. capacity.

(Continued on next pages)

Digitized by Google

(Continued from preceding page)

TINIUS OLSEN TESTING MACHINE CO. PHILA., PA.



Olsen Hydraulic Brinell Hardness Testing Machine

Olsen Hardness Testing Machines for applying Brinell Test:

These machines are built in various types and sizes, so as to meet all requirements.

Alternate Stress Impact and Special Testing Machines:

We build all the latest up-to-date Special Testing Machines such as the OLSEN-FOSTER Alternate Torsion Testing Machine, Upton-Lewis Toughness and Endurance Testing Machines, McAdam Impact Shear Testing Machine, Olsen Impact Tension Testing Machines, Turner Impact Tester, Matsamura Repeated Impact Tester, Norris Abrasion Testing Machine, also the Flowers and the Hayes-Lewis type of Viscosimeters.

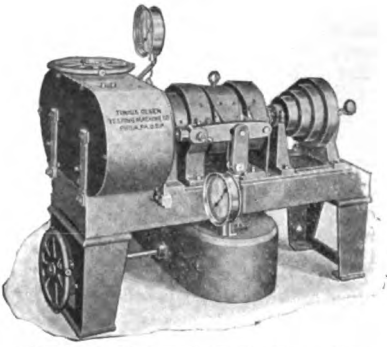
OLSEN UNIVERSAL EFFICIENCY TESTING MACHINE:

The advancement in the art of making high-speed cutting steel and the ever-increasing use of special cutting tools of such steel have necessitated the development of special efficiency testing machines, for determining their cutting quality.

It has been determined that various tool steels should be operated at a definite speed for maximum efficiency depending on their treatment and the material they are to cut. The shape of such tools are of the utmost importance, as slight variations in angle or clearance of cutting edges may cause a variation of several hundred per cent. in production.

It is essential, therefore, that all such tools be tested thoroughly and for this purpose the Olsen Universal Efficiency Testing Machine was developed.

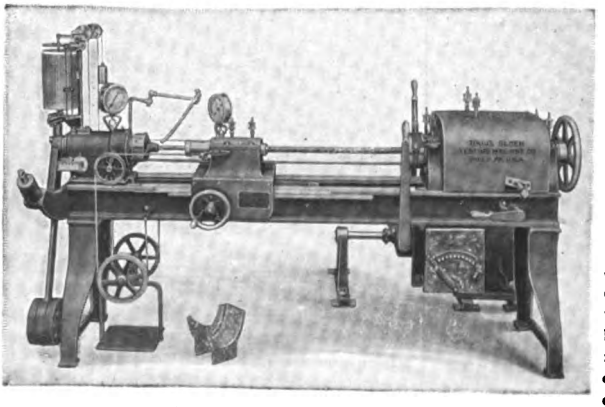
OLSEN BALL-BEARING TESTING MACHINE—S K F TYPE:



50,000 lbs. Cap. Radial and Thrust Load

The greater use each year of ball and roller bearings under the most severe conditions has necessitated our designing and building many types and sizes of ball bearing testing machines, of which the one shown is the most complete. It is designed to meet the rigid requirements of the S K F Company.

Special bulletin covering such machines on request.



Olsen Universal Efficiency Testing Machine

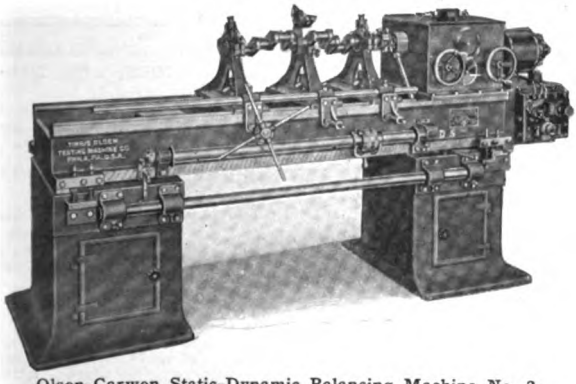
Special Olsen Testing Machines are built for determining the ductility of sheet metal by cupping same and weighing pressure applied both statically and by press motion. Made in both indicating and recording or autographic types.

Special testing equipment can also be secured for testing welds and welding material by the New Patent Owen method and apparatus, which covers the only known way of testing welds and welding material at the present time.

Digitized by Google

TINIUS OLSEN TESTING MACHINE CO. PHILA., PA.

OLSEN-CARWEN STATIC-DYNAMIC BALANCING MACHINES:



Olsen-Carwen Static-Dynamic Balancing Machine No. 3. Patented in the U. S. and all foreign countries including S. A. and Japan, etc.

In this age of high speed machinery it is essential for their successful and continued use that all rotating parts are in perfect balance.

The unbalance in any rotating part is either static or dynamic or both, and it is necessary to rid the part of all such unbalance, wherever it lies.

The Olsen-Carwen Balancing Machine with the Olsen-Lundgren attachment enables the operator to determine the exact amount of unbalance statically first, together with the plane or angle of unbalance. This static unbalance is then temporarily corrected on the machine, and the point along the length of the rotor or the particular crank of a crankshaft found at which such a static unbalance should be corrected to prevent the introduction of a dynamic couple.

If a dynamic unbalance is still present, this is then found as to amount and plane or angle and the entire correction for both static and dynamic unbalance made at one and the same time.

The feature of determining the point along the length of the rotor or the crank of the crankshaft at which static unbalance should be corrected is of exceedingly great importance, as very often a rotor only has a static unbalance which, if corrected at the wrong point along its length, only introduces a dynamic unbalance, requiring more time and work to eliminate.

The Olsen-Carwen Balancing Machine will balance any rotating part perfectly with speed and economy, thereby placing the art of balancing on a production basis, so each and every crankshaft, fly-wheel, fan and driving shaft of an automobile or truck can readily be balanced, as well as every armature or rotor used in the electrical world.

Olsen-Carwen Static-Dynamic Balancing Machines are made horizontal, as shown, in many sizes; from that for balancing small armatures up to that for balancing the largest of rotors. Also special machines for crankshaft balancing. For where a crankshaft has more than two (2) bearings it is imperative to mount same in three (3) bearings in the balancing machine for accurate results.

Olsen-Carwen Static-Dynamic Balancing Machines are made vertical, in various sizes, for balancing separator bowls, etc. with the liquid contained in them.

RESEARCH AND BALANCING DEPARTMENT:

We maintain a complete Research and Testing Department with Balancing Machine equipment under the supervision of the very best expert balancing engineers.

We are thus in a position to balance any rotating parts, crankshafts, rotors or complete engines and make recommendations to you as to design and construction, tending to eliminate vibration and also to design and build special balancing machine equipment based on principles used only in the Olsen-Carwen Balancing Machines and controlled by us.

Bulletin covering the theory and art of balancing on request.

Digitized by Google

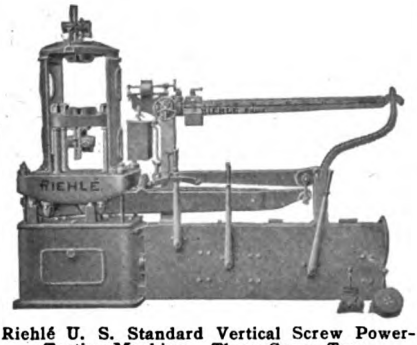
RIEHLÉ BROS. TESTING MACHINE CO.

1424 NORTH 9TH STREET, PHILADELPHIA, PA.

Manufacturers of Testing Machines and Testing Appliances

RIEHLÉ TESTING MACHINES:

Are used by the leading Colleges, Steel and Iron Works, United States Government, many foreign Governments, and are recommended by many of the most prominent and successful Engineers throughout the world. We design and build these machines from **5000 lbs. to 2,000,000 lbs. and over in capacity** for the determination of any physical property.



Riehlé U. S. Standard Vertical Screw Power-Testing Machine. Three-Screw Type, 100,000 Lbs. Capacity

Features of Riehlé Testing Machines:

Designed Right.

Plenty Strong Enough.

No Sparing of Material.

Long Base Lines.

Simple in Construction.

All parts Accessible without taking whole machine apart.

Fine Finish. Attractive in Appearance.

NOTE:

We are now building all the **Riehlé Vertical Screw Power-Testing Machines** with two (2), three (3), or four (4) Main Pulling Screws as may be desired.

For quick and convenient reference our complete line of Testing Machines is catalogued as enumerated below:

RIEHLÉ TESTING MACHINE CATALOGUE "A:"

Illustrating and describing all the **large Riehlé U. S. Standard Testing Machines, Screw and Hydraulic Power,** also new and ingenious tools for same; **Machines for Long Transverse Members, Torsional and Impact Testing,** also **Calibrating Levers.**

RIEHLÉ CATALOGUE "AA" OF EXTENSOMETERS, COMPRESSOMETERS, AND TORSION METERS:

Containing illustrations and descriptions of the very latest and best **Riehlé Extensometers.**

RIEHLÉ TESTING MACHINE CATALOGUE "B:"

Embracing all the various styles of **Reihlé U. S. Standard Testers** for **Wire, Cloth, Canvas, Cord, Twine** and **Textile Fabrics** of all kinds, also for every variety of test. This catalogue is well worth your careful perusal.

RIEHLÉ CHAIN TESTING MACHINE CATALOGUE "C:"

In this Catalogue is found all that is *newest and best* in **Testing Machinery** for **Chain, Wire, Hemp, Rope, Eye-Bars, Bridge Irons,** etc. **Special Machines** for different forms of materials can be designed along these lines. We also furnish **Hydraulic Pumps** separately if desired. We claim these **Machines** are the **Strongest** and **Best in the World.**

RIEHLÉ TESTING MACHINE CATALOGUE "D:"

Containing illustrations of **Transverse Bending** and **Special Testing Machines, Rope Twisters, Loam Mills, Pipe Provers,** etc. Every **Foundry** and **Machine Shop** should install some of the articles shown in this Catalogue.

RIEHLÉ TESTING MACHINE CATALOGUE "E:"

Those interested in **Machines** for testing **Springs** of all kinds, also **Oils** and **Bearing Metals,** are especially referred to this Catalogue for all the newest and best **Machines.**

RIEHLÉ CATALOGUE "F:"

In this Catalogue are presented illustrations and descriptions of superior designs and patterns of **Hand** and **Power Hydraulic Pumps and Presses,** also **Riehlé-Robie Patented Screw Jacks,** etc.

RIEHLÉ CEMENT-TESTING MACHINE CATALOGUE "G:"

In this Catalogue one will find **"everything that is good"** in the way of testing **Cements, Asphalts, Building Material,** and also every *conceivable article* for thoroughly equipping a **Physical Testing Laboratory** for that kind of work. Be sure and send for this Catalogue.

RIEHLÉ ROAD MATERIALS TESTING MACHINE CATALOGUE "K-1:"

In this Catalogue you will find illustrations of everything to make tests of Road Materials, as used by the United States Government, Department of Public Roads, Washington, D. C.

Select the Catalogues you want when ready to order.

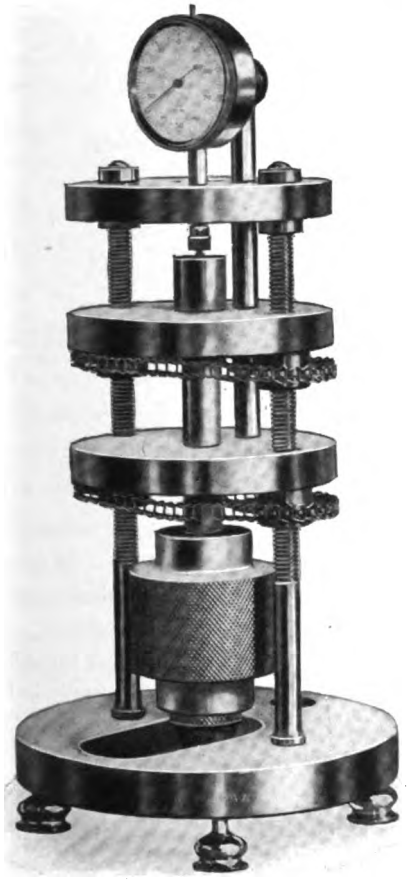
We are the oldest and largest Testing Machine manufacturers in the United States. Established 55 years ago.

Digitized by Google

THE PUSEY AND JONES COMPANY

WILMINGTON, DELAWARE, U. S. A.

Engineers and Manufacturers of Pulp and Paper Making Machinery, Marine Equipment, Chemical Apparatus, etc.



THE PLASTOMETER:

The plastometer measures and indicates the degree of hardness or density or of plasticity of rubber leather, fibre or any other resilient material.

The degree of hardness or density is found by measuring the depth of the depression produced by the weight of one kilogram on a ball 1/8" diameter or for softer substances a ball 1/4" diameter.

Any material may therefore be standardized as to its hardness or density or plasticity.

For example, most of the rubber manufacturers have installed plastometers. In ordering new rubber or in ordering for duplication, the degree of hardness or density may be specified by including in the order the words—Plastometer reading 60 to 70 with the 1/8" ball. A commercial tolerance of five points above and five points below the desired reading is recommended. Thus may be given directions understood by the manufacturer while the buyer's plastometer also enables him to check up on receipt of the goods.

The plastometer is furnished in a portable mahogany case, with directions for use attached to the lid of the case.

The price is $175.00.

Digitized by Google

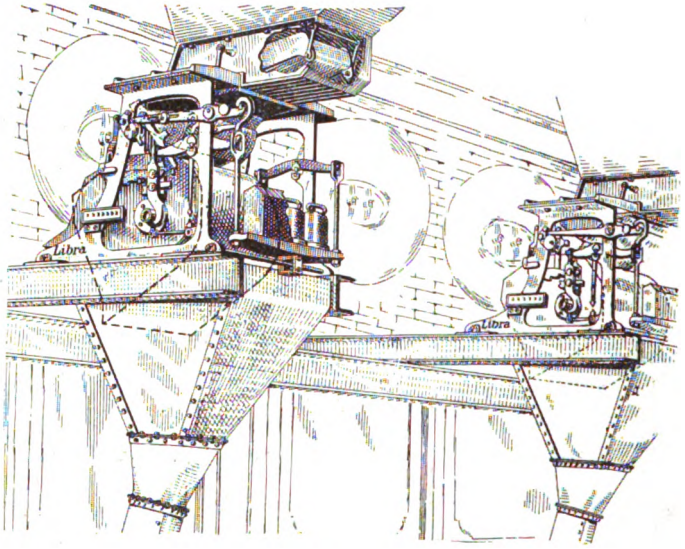
ERNEST H. DuVIVIER

ENGINEER

30 CHURCH ST., NEW YORK, N. Y.

Representing Libra Scale Company, Germany

Builders of Automatic Scales for all Materials



THE "LIBRA" AUTOMATIC SCALES:

Designed for the accurate and automatic weighing of coal, stone, ash, ore, grain and other solid substances and also light and viscous liquids.

This scale automatically indicates, records and integrates the weight of the material passing through it with a guaranteed accuracy.

Construction:

There are no troubles from dust or gumming of bearings as the main working parts move on hardened-steel knife edge and pan bearings.

There is no seepage, dribbling or partly retained material to affect the accuracy of this scale. A positive acting gate cuts off material as soon as hopper comes to a balance and then hopper turns completely over, discharging *all* its contents.

This scale is constructed on the principle of an equal arm beam. It may be set and checked or verified at any time without interfering with the weighing. It is not necessary to draw off material to another scale to check weighing accuracy.

Scales for weighing solids are furnished in sizes from 50 lb. capacity, to discharge 5000 lbs. per hour, up to 2600 lb. capacity, to disharge 240,000 lbs. per hour. Greater capacities built to suit requirements.

Scales for weighing liquids furnished in sizes 22 lb. capacity, to discharge 1300 lbs. per hour, up to 9000 lb. capacity, to discharge 270,000 lbs. per hour.

Information:

We know the "Libra" scale will save you money. Its accuracy will stop leakages of materials and promote efficiency.

Send us the hourly capacity required, nature of material, size of largest pieces, etc., and we will furnish prices and complete particulars.

Digitized by Google

RELIANCE WEIGHING MACHINE DIVISION

Stearns Motor Manufacturing Co.

GENERAL OFFICE AND FACTORY: LUDINGTON, MICHIGAN

REPRESENTATIVES IN PRINCIPAL CITIES OF THE UNITED STATES AND CANADA

Sole Manufacturers of Reliance Automatic Hopper Scales. Mechanical Weighing and Recording of Bulk Materials

AUTOMATIC HOPPER SCALES for every need which arises in the handling of bulk materials:

Coal	Salt	Lime
Cement	Sand	Grain

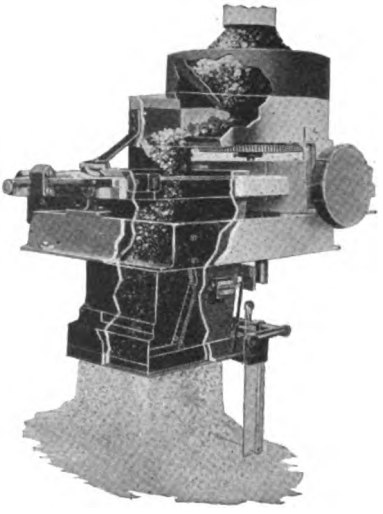
Food Products, etc.

RELIANCE AUTOMATIC COAL SCALE:

The new RELIANCE is without doubt a revelation in boiler room economy in getting an absolute check without human attention or manual effort on all the coal consumed and coal paid for as well as enabling the fireman to point out the boilers which are "hogging" the coal. It further enables him to determine the number of heat units obtained from various grades of coal from different mines. With the high prices of coal is there any record of more importance than to know the exact amount of coal consumed?

The RELIANCE is accurate, dependable and positive in operation, which are the features the engineering field has been waiting for in automatic scales for years.

RELIANCE AUTOMATIC COAL SCALES can be installed wherever overhead bunkers afford a gravity feed or wherever it is possible to elevate the coal by a conveyor or other means above the



scale. RELIANCE AUTOMATIC SCALES have been in continuous operation for twenty-two years.

A few representative users are:

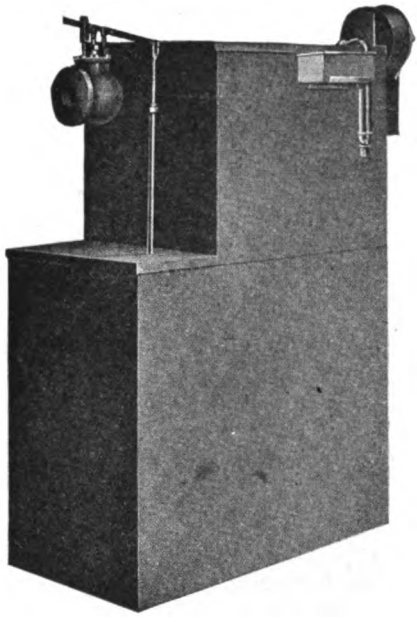
The Continental Motors Corp.,
The Miller Rubber Co.,
The Milwaukee Electric Railway and Light Co.,
The Quaker Oats Co.,
The U. S. Food Products Corp.,
The Wisconsin Food Products Corp.,
The Halcomb Steel Co.,
The A. O. Smith Corp.,
The Kobe and Co.,
The Spanish River Pulp & Paper Co., etc.

Digitized by Google

WILLCOX ENGINEERING CO.

SAGINAW, MICHIGAN

Manufacturers of Water Weighers



WILLCOX AUTOMATIC WATER WEIGHER (Patented):

Rectangular type with storage tank forming the base of the weigher, and automatic control of inlet supply to the weigher.

Service: Takes water from any source, such as a feed-water heater tank, pump or hydrant, at any rate of flow or at varying rates, and delivers it intermittently in accurately weighed unit charges.

Weighs hot feed-water from an open heater, cold water from a hydrant, water of condensation from vacuum pans or heating systems, also chemicals, caustic solutions, volatile oils, sugar juices, etc.

Operation: The charge is weighed by a liquid column of fixed height, through the medium of an air balance. The unit charge is dumped automatically by the sudden release of the entrapped air—an extremely accurate and reliable method of balancing.

All Parts Accessible: The weigher is constructed so that every part is easily accessible and the bell float and other operating parts can be taken out of the machine and replaced without disturbing the setting of the machine, or breaking any packed joints. The machine is so constructed that its entire cycle of operations can be seen while the machine is working. Dirt and scale within any reasonable amount will not affect its accuracy or its operation, and it can be easily cleaned.

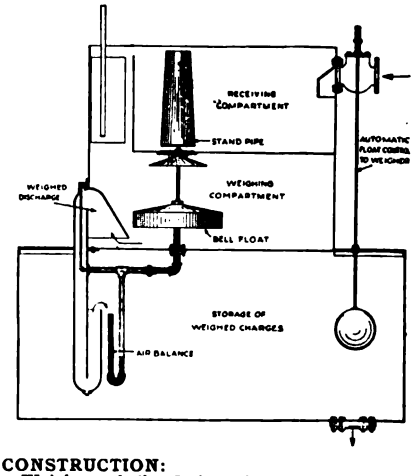
Only One Moving Part: There is practically no friction, there being only one moving part in the machine, namely, the belt float with its attached stand pipe. This part has a floating movement up and down of about one inch at each weighing.

Accuracy: Maximum per cent. of inaccuracy of the weigher at all loads from one-tenth of its maximum capacity up to said maximum, one per cent. of weight; the average weight of any ten consecutive unit charges being compared with the average weight of any other ten unit charges.

Capacities: Made in capacities from five thousand pounds to five hundred thousand pounds per hour to suit various requirements; portable weighers for evaporative and condensing tests; and power-plant sets for permanent installation.

Storage Tank and Float Control: Willcox Engineering Co. will furnish a storage tank, forming the base of the weigher as illustrated, and fitted with a balance-pressure valve on the inlet to the weigher, the balance-valve being controlled by a float in the storage tank, thereby automatically regulating the frequency of the weighings, according to the varying demands of the plant, and automatically maintaining an approximately uniform level in the storage tank. Where the weighed charges can be delivered from the weigher direct into a sump or tank already available at the plant, the storage tank illustrated can be omitted. Weigher can be furnished with or without the storage tank and balance-valve as desired.

Diagram Recorder: Draws a diagram showing at a glance the variations in rate of supply during a test. A valuable check for boiler trials and condensation tests. The Diagram Recorder Attachment can be furnished for any size or style of weigher, and with either a twelve-hour or a twenty-four hour clock, and arranged to operate either by mechanical connection to the weigher as illustrated, or electrically, at a distance from the weigher, as desired. Diagram Recorders are furnished on special order only.



CONSTRUCTION:

Weigher shell. Built of tank steel with seams welded.

Fittings: Cast brass and vanadium steel; bell float and stand pipe made of heavy sheet brass.

Register: White dial indicating through a glass cover. Each weighed charge is indicated as delivered.

Heavy Steel Inlet Screen: On inlet to weigher to prevent entrance of pieces of scale or foreign matter.

(See page 613 for additional products of this Company)

Digitized by Google

NATIONAL METER COMPANY

Established 1870

299 BROADWAY NEW YORK CITY

Manufacturers of Water Meters

BRANCH OFFICES:

CHICAGO, 2626 So. Park Ave. BOSTON, 287 Atlantic Ave. CINCINNATI, 415 Sycamore St.
ATLANTA, 251 Ivy St. SAN FRANCISCO, 141 New Montgomery St.
WINNIPEG, MANITOBA, 111 Ethelbert St.

No matter what your conditions may be, we can offer you the BEST METER FOR YOUR SERVICE.

THE CROWN METER:



A positive displacement water meter of the rotary piston type. This meter has been made and sold by us for over forty years. It is substantial, durable and accurate. In sizes from 5/8" to 6".

THE EMPIRE METER:



A positive displacement water meter of the oscillating piston type. It is the most accurate, durable and generally satisfactory meter manufactured. Owing to the simple construction of its measuring chamber the accuracy of this meter can be maintained indefinitely at a minimum cost. The Empire meter is also manufactured for measuring oil—hot or cold, cane juice, brine, vinegar, liquid soap, gasoline, wine, etc. Made in sizes from 5/8" to 6".

THE NASH METER:



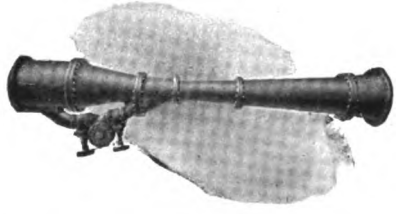
A water meter of the disc type. The Nash meter has been on the market for over thirty years and is strongly constructed and reliable. Its special frost-proof feature and straight-reading register are both desirable advantages. Made in sizes from 5/8" to 6".

THE GEM METER:



A water meter of the velocity or current type and has been made by us since 1870. It is intended for service when a large and rapid delivery of water is of special advantage. Made in sizes from 2" to 12".

THE PREMIER METER:



A water meter constructed of a Venturi tube and a by-pass on which an accurate positive displacement meter is installed. This meter is intended to measure the complete supply of a city or other large service. The Premier is made in sizes from 8" to 48".

THE EMPIRE COMPOUND METER:



A water meter constructed by combining our Empire and Gem meters. It will measure with great accuracy large and small flows and will operate most satisfactorily under greatly varying conditions. The Empire section is always open. The Gem section is controlled by a check valve which opens automatically when called upon to measure a stream larger than the capacity of the Empire. Made in sizes from 2" to 12".

SEE OUR ADVTS. IN MECHANICAL ENGINEERING THE JOURNAL OF THE A.S.M.E.

Digitized by Google

NEPTUNE METER COMPANY

50 EAST 42ND STREET, NEW YORK CITY

Trident Water—Oil—and Gasoline Meters
Weber Subterranean Pump

BRANCH OFFICES

ATLANTA	LOS ANGELES	SPOKANE
BOSTON	PORTLAND	VANCOUVER, B. C.
CHICAGO	SALT LAKE CITY	LONDON, ENGLAND
CINCINNATI	SAN FRANCISCO	PARIS, FRANCE
DENVER	SEATTLE	KOBE, JAPAN

TRIDENT PRE-EMINENCE:

Over 2,000,000 Trident Meters in service throughout the world. The largest Meter Manufacturer in the world. Service everywhere. Write us.

FOR EVERY CLASS OF SERVICE:

There is a Trident Meter for every Class of Service. Special Departments for Water, Gasoline, Oil and other liquids. Write us your meter problem and our engineers will solve it.



Trident
Breakable Bottom



Trident Split Case
(Water, Oil, Gasoline)



Trident Style 3
(Water, Oil, Gasoline)



Trident Victor



Trident Portable Test



Trident Crest



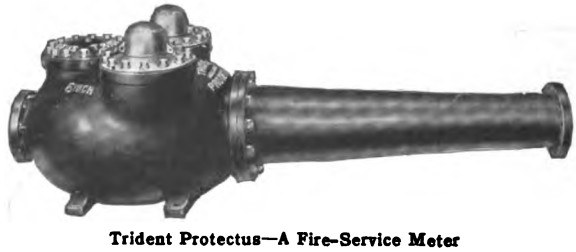
Trident Compound



Trident
Water Cart



Trident
Vertical
Crest



Trident Protectus—A Fire-Service Meter

Digitized by Google

PITTSBURGH METER COMPANY

GENERAL OFFICE AND WORKS: EAST PITTSBURGH, PA.

NEW YORK	CHICAGO	KANSAS CITY	SEATTLE	LOS ANGELES	COLUMBIA, S. C.
50 Church St.	5 S. Wabash Ave.	Mutual Bldg.	Ry. Exch. Bldg.	Union Oil Bldg.	1433 Main St.

Manufacturers of Ironclad Cast Iron Dry Gas Meters, Positive and Proportional Gas Meters, Meter Provers, and Keystone, Arctic, Keystone-Compound, and Eureka Water Meters. Also Meters for Measuring Oil, Gasoline and Hot Water

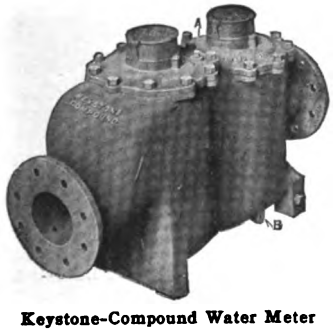
WATER METERS:

Meters for hot or cold water, oil, gasoline and other fluids.



Arctic Water Meter

Arctic Water Meters for cold climates, Keystone Water Meters for mild climates. These are Disc-Type Meters. In the Current or Inferential Types we manufacture the Eureka Meter, and in the Compound Type the Keystone-Compound.



Keystone-Compound Water Meter

Among these various types may be found meters adapted to every class and condition of service—domestic, commercial and industrial.

GAS METERS:

Meters for natural and artificial gas of all kinds, including that used in the arts, as well as for combustion, are manufactured in both wet and dry types.

Westinghouse Gas Meters, positive and proportional, are particularly adapted for gases at high or low pressures, in large or small volumes and are specially constructed for casing-head gas.



Westinghouse Positive Gas Meter

Their all-metal construction gives them great durability under all conditions of severe service.

The Ironclad Cast Iron Dry Gas Meter is designed for use on Artificial or Natural Gas for domestic, commercial and small industrial services.



Ironclad Dry Gas Meter

Its simplicity of construction combined with the material used, affords an extremely low maintenance cost in conjunction with a high degree of accuracy.

We also manufacture apparatus for proving water and gas meters.

Digitized by Google

UNION WATER METER CO.

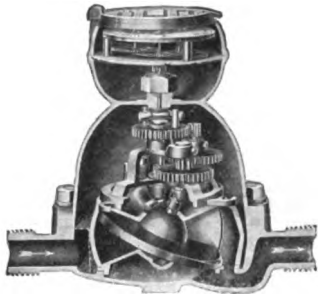
Incorporated 1868

MAIN OFFICE & WORKS: WORCESTER, MASS.

A meter for every service.
Service with every meter.

Products: Meters, Cold Water, Hot Water, Oil, Gasoline, other fluids; Union Fitts Chronometer Valves; Union Press for lining Service Pipe with cement; Union Pressure Regulators, no springs; Worcester Steam Fire Signals.

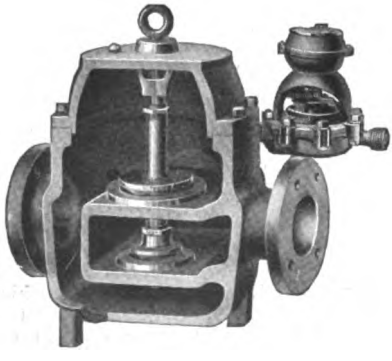
KING MODEL "B" DISC METER:



Positive measuring self-draining type unsurpassed for strength, simplicity, durability and accuracy under varying conditions. Made for cold water, hot water, gasoline and other fluids. *Catalogue M-49.*

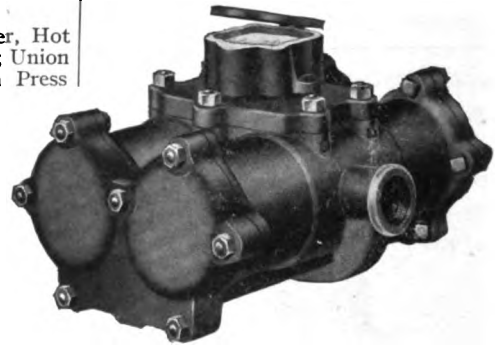
Hot water meters have Union Co-Hot Discs, not metal, insuring accuracy and service.

UNION COMPOUNDING VALVES:



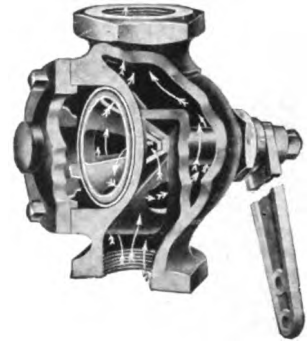
Make efficient compound meters of all meters 2"–10" at less the cost of new compound meter. *Catalogue M-49.*

UNION OIL METER:



The double-acting reciprocating piston type. The single conical valve has a rotary motion which insures continued accuracy and long service.

UNION FITTS CHRONOMETER VALVES:



Designed for regulating and governing purposes only and should not be used as stop valves.

They are of the rotating valve type, having a conical valve ground to a joint with the seat and ports so arranged that a rotation through an arc of 45 degrees, one-eighth turn, completely opens or closes the valve. *Catalogue M-50.*

NILO COMPOUND METER:

Large in capacity, built for service—elimination of bearing of metal to metal prevents galvanic action and sticking due to corrosion. *Catalogue M-49.*

Digitized by Google

BUILDERS IRON FOUNDRY

PROVIDENCE, R. I.

Venturi Meters; Globe Special Castings for Water Works; Grinding Machinery; Polishing Machinery

VENTURI:

The Standard Meter for Liquids and Gases.



Type M Register-Indicator-Recorder

Hot Water (*Bulletin No. 93*).

The Venturi is admirably adapted to the measurement of hot boiler feed water, hot water from condensers, hot circulating water for heating systems, etc. The entire absence of mechanism or projections within the Venturi Tube, which is the only portion of the METER through which the water flows, prevents scoring, warping and clogging.

Gravity Mains, Pumping Lines, Filtration Plants, Sewage Disposal, Hydraulic Turbine and Industrial Plants.

(*Bulletin No. 210.*)

Originally used only for metering large water supplies, the field of the Venturi has been extensively increased to include a great variety of measurement and control applications in public works and industrial plants. It is an accepted standard for testing pumps and most specifications for new pumping units include a Venturi Meter. The Bulletin gives full data regarding capacities, dimensions, etc.

Air and Gases (*Bulletin No. 86*).

Among the advantages of the Venturi Meter for measuring air and gases are low price, negligible cost of installation, small space required and variety of information concerning quantity and rate of flow furnished by three dials. Municipal gas supplies, coke oven gas, natural gas, compressed air, blast furnace gas, etc., at either high or low pressures are accurately metered by the Venturi.

Steam (*Bulletin No. 79*).

The amount and rate of steam used by steam turbines, heating systems and many manufacturing processes using steam, the performance of individual boilers, etc., are accurately accounted for by means of the Venturi Steam Meter.

277

If your file does not contain these bulletins, write our nearest agency.

SEE OUR ADVT. IN MECHANICAL ENGINEERING THE JOURNAL OF THE A.S.M.E.

BRANCH OFFICES

25 Church Street, New York, N. Y.
Oliver Bldg., Pittsburgh, Pa.
The Rookery, Chicago, Ill.
512 Praetorium Bldg., Dallas, Texas.
Earl F. Scott & Co.,
Candler Bldg., Atlanta, Ga.
N. B. Livermore & Co.,
San Francisco, Calif.
Grinnell Co., Inc.,
Los Angeles, Calif.
Northwestern Equipment Co.,
Portland, Oregon.
Allen General Supplies, Ltd.,
Toronto, Can.
General Supply Co.,
Ottawa, Montreal, Winnipeg & Vancouver, Can.



The Venturi Tube

Digitized by Google

SIMPLEX VALVE & METER COMPANY

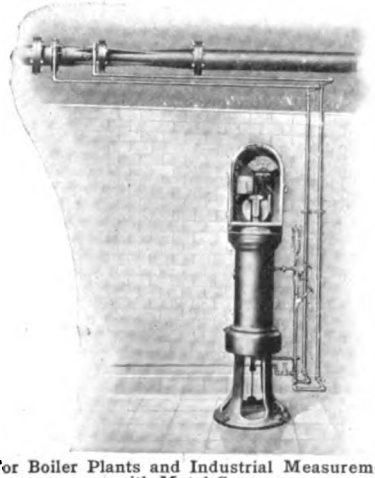
GENERAL OFFICE AND FACTORY, PHILADELPHIA, PA.

REPRESENTATIVES

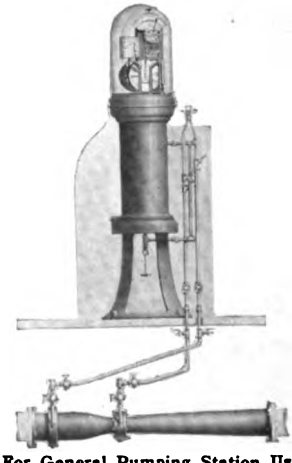
CANADIAN, Francis Hankin & Company, Montreal, Toronto and Vancouver, Canada
PACIFIC COAST, Water Supply & Equipment Company, San Francisco and Los Angeles
NEW ENGLAND, Geo. W. Stetson, 141 Milk St., Boston, Mass.
L. E. POLLARD CO., 423 Fifth St., South, Minneapolis, Minn.
JOHN D. HILES COMPANY, 1722 Oliver Building, Pittsburgh, Pa.
T. C. McFARLAND, Mutual Building, Kansas City, Mo.
CHAS. McINTOSH COMPANY, Dime Bank Building, Detroit, Michigan
A. MacLACHLAN, 876 Rockafeller Building, Cleveland, Ohio

Manufacturers of Water Measuring and Controlling Devices with Venturi and Pitot Tube Meters, Rate of Flow Controllers, Filter Gauges, Portable Flow Recorders, Manometers, Altitude Valves. Water Flow Investigations

Venturi Tube can be horizontal or vertical



For Boiler Plants and Industrial Measurement, with Metal Cover



For General Pumping Station Use with Glass Cover

SIMPLEX METERS WITH VENTURI TUBES:

Operated by Simplex shaped displacement floats, which move in direct proportion to the total velocity without sliding friction.

Simplex Meters *are used when it is desired to measure the greatest range of flow of liquid with the greatest accuracy.*

Construction is reduced to the simplest form. They prove dependable in service. They are sensitive and, at the same time, accurate.

These meters may be used for measurement of SEWAGE, INDUSTRIAL LIQUIDS, HOT and COLD WATER, etc. They may be installed so as to be proof against freezing.

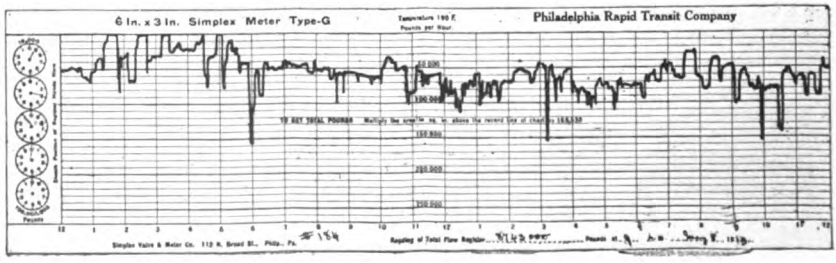
They are fully described in Bulletins.

13C, Water Meters for General Purposes.

13D, Simplex Hot Water Meter.

13E, Simplex Pitot Tube Meter.

RECTANGULAR CHART FROM SIMPLEX METER
Uniform graduation for all velocities



Digitized by Google

BACHARACH INDUSTRIAL INSTRUMENT CO.

PITTSBURGH, PA.

Manufacturers of Precision Instruments

"HYDRO" PRESSURE RECORDERS



are the simplest and most accurate instruments for recording pressure, vacuum, or differential pressure. The absence of stuffing boxes, gears, levers, diaphragms, or electrical devices completely eliminates friction, thus producing an instrument that quickly responds to changes in pressure.

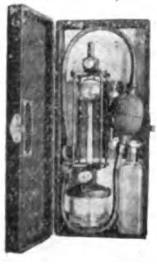
Pressure, vacuum or differential pressure as low as one thousandth of an inch of water or as high as 15 lbs. per sq. inch, is measured and recorded accurately on rectangular charts.

"HYDRO" FURNACE RECORDERS



are designed especially to give a graphic record of the draft conditions for boilers and furnaces. They have a maximum range of 4″ water and are furnished in three types. SINGLE DRAFT, may be either above or below the pressure of the atmosphere or both, such as furnace draft. DIFFERENTIAL DRAFT between any two points. For example between furnace and under the damper. COMBINED SINGLE AND DIFFERENTIAL, recording the two on the same chart, such as furnace draft and differential between furnace and under damper.

CARBON DIOXIDE INDICATOR:



A simple, compact and rugged instrument for the determination of carbon dioxide in the flue gases. No special skill or knowledge required for its operation. Packed complete in carrying case.

SEE OUR ADVTS. IN MECHANICAL ENGINEERING THE JOURNAL OF THE A.S.M.E.



"HYDRO" GAS METERS indicate, record and integrate the volume of gas flowing in pipes and ducts. They have an unlimited capacity and their accuracy is unquestioned. Can be used for static pressures as high as 15 pounds per square inch.

INDICATING FLOW METER is an inexpensive and accurate instrument for indicating the volume and pressure of air delivered to cupolas, water gas sets, etc. Provided with special valve which opens and closes both pressure lines simultaneously and also arranged so that a zero reading can be taken without disconnecting pipe lines.

PITOT TUBES:

All sizes and types from the delicate instrument for laboratory and experimental work to the large tubes for unwashed blast furnace and producer gas. Also special magnifying tubes for low velocities.

THIN PLATE AND STANDARD ORIFICES of any size and to fit any pipe. Great care is used in forming the standard orifices to the correct shape.



MANOMETERS:

The V shape of the frame gives complete protection to the glass tube and permits the reading of the scale from any angle. Any liquid can be used, the instrument having a maximum range of 42″ mercury.

STEAM AND GAS ENGINE INDICATORS:

The Maihak type of indicators comes in three styles which cover the entire range of speeds up to 1500 R. P. M. This indicator can be fitted with the power integrator which gives, without calculation, the mean indicated H. P. over a given time of any reciprocating unit.

Digitized by Google

BAILEY METER COMPANY

2009 E. 46TH ST., CLEVELAND, OHIO

Manufacturers of Recording Meters and Instruments

BAILEY FLUID METERS:

Are the most practical and accurate meters for recording and integrating the flow of steam to turbines, engines, heating systems, general mill use; low pressure steam, exhaust, and in fact for all purposes. Equally well adapted to measure the flow of water, air, gases and other fluids, under practically all conditions of pressure, temperature and capacity.



280

There are but two moving parts to this meter and they are not subjected to the direct action of the steam, hot gases or other fluid being metered. The meter is operated by a pressure difference which is produced by the fluid flowing through an orifice placed between a pair of flanges in the pipe line.

Bailey Fluid Meter Type C2 Recording and Integrating Flow, also Recording Pressure and Temperature illustrated above.

BAILEY BOILER METER:

This meter records Steam Flow, Air Flow and Flue Gas Temperature all on the same chart. It may also be provided with fire box draft indicator, wind box pressure recorder or other supplementary records. It also may be provided with integrator giving the total evaporation from the boiler in thousand pounds of steam, from which the actual evaporation of useful steam delivered to the header per pound of coal is determined.

The most important feature of this meter lies in the ratio between the Air Flow and Steam Flow. Air is a fuel just as much as coal, and a certain evaporation per pound of air should be obtained. When this condition exists the two pens and records show the same reading. When there is an excess of air, the Air Flow reading is greater than the Steam Flow. A deficiency of air resulting in loss due to unburned gases is shown by the Air Flow reading being less than the Steam Flow.

Flue gas temperature recorded on the same chart is a positive check against dirty tubes and leaky baffles.

BAILEY WEIR METER:

Records and integrates flow of water or other liquids through V-Notch of rectangular weirs. For feed water, hot well discharge, etc., at or near atmospheric pressure.

BAILEY GAS METER:

Records the rate of flow of low pressure gas or air at high or low velocities, with 4¼ inch pen motion on 12 inch chart and integrates total flow reading directly in cubic feet. It can be equipped to record pressure or temperature or both on the same chart. Net pressure loss due to meter ½ inch of water.

The orifice can be easily inserted in some existing flange and requires no alterations in the piping. A change of orifice will give a change in capacity at slight cost. The recorder may be connected to two or more pipes so that records may be taken at will. It can be conveniently moved so that it is available for tests and temporary installations.

These meters are now in use measuring coke oven and other gases and several years' service has demonstrated their reliability.

The meter is low in first cost and maintenance and operating costs are negligible.

OTHER TYPES:

Many other types of recording meters for special purposes such as specific gravity of liquids or gases, relation between the flow of two fluids or gases, differential temperatures and rate of flow for economizers and hot water heating systems.

Bulletins describing the complete line of Bailey Recording Meters will be sent free upon request.

SEE OUR ADVT. IN MECHANICAL ENGINEERING THE JOURNAL OF THE A.S.M.E.

Digitized by Google

REPUBLIC FLOW METERS CO.

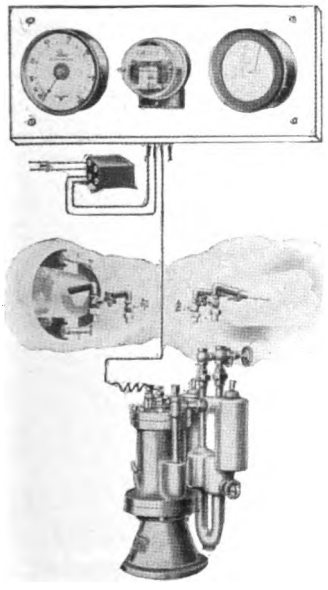
2240 DIVERSEY PARKWAY, CHICAGO, ILL.

Manufacturers of Flow Meters and CO_2 Recorders

NEW YORK	PITTSBURGH	TORONTO	SEATTLE
BOSTON	DETROIT	MINNEAPOLIS	PORTLAND
PHILADELPHIA	BIRMINGHAM	DENVER	SAN FRANCISCO
	CINCINNATI	KANSAS CITY	LOS ANGELES

REPUBLIC FLOW METERS:

Measure the flow of steam, water, air, and gas accurately and conveniently. A Pitot Tube or Orifice Disc is used to obtain the differential pressure of the flow, the selection of one or the other being determined by the conditions of flow.



ADVANTAGES:

Maximum Accuracy:

The maximum accuracy is insured by the highly sensitive electrical instruments which are governed by the well-known relation between velocity of fluids and equivalent pressure.

No Moving Parts:

By employing electric current to transmit the action to the reading instruments, all uncertain mechanical appliances such as floats, cams, levers, gears and stuffing boxes are avoided. There are no moving parts in the Meter Body to interfere with the true level of the mercury column.

Flexibility of Installation:

Due to the electrical principle of operation, the instruments for indicating, integrating and recording the flow may be arranged to conform with every variation of plant conditions. They can either be separated, combined, or duplicated and can be placed at any desired distance from the measured line and at any point however remote from the Meter Body.

REPUBLIC CO_2 RECORDERS:

Have been developed to meet a demand for a simple, accurate, and reliable apparatus for analyzing flue gases. The analysis is recorded by a continuous line on the chart, while the samples are analyzed at certain fixed intervals which is recognized as the better method of obtaining CO_2 percentages.



IMPORTANT FEATURES:

Simplicity
No Small Tubing
No Valves Used in the Construction
No Glass
Positive Action of the Siphon System
Complete Absorption of CO_2
Continuous Flow of Gas from the Furnace
Maintained Accuracy
Indicating and Recording
Light Weight
Accessibility

SEE OUR ADVTS. IN MECHANICAL ENGINEERING THE JOURNAL OF THE A.S.M.E.

Digitized by Google

THE JOS. W. HAYS CORPORATION

1042 E. EIGHTH ST., MICHIGAN CITY, INDIANA

Manufacturers of Hays Combustion Efficiency Appliances

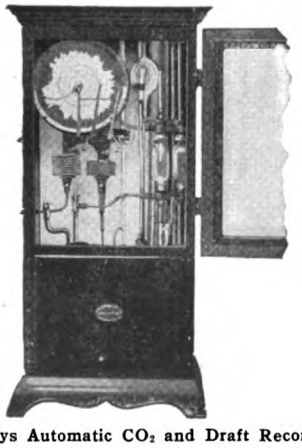
DRAFT GAGES:



Hays Draft Gage for the Boiler Front

Draft Gages of all styles and ranges for all purposes, finished in nickel, aluminum or black enamel (baked). The illustration shows the Hays 1″ differential draft gage for boiler furnaces. The black enamel case never tarnishes; the scale is easily read; there is a micrometer leveling attachment to bring the oil to zero conveniently. Practical engineers designed them. Write for a 24-page treatise on Drafts and Draft Regulation, by Jos W. Hays, Combustion Engineer.

HAYS AUTOMATIC CO_2 AND DRAFT RECORDER:

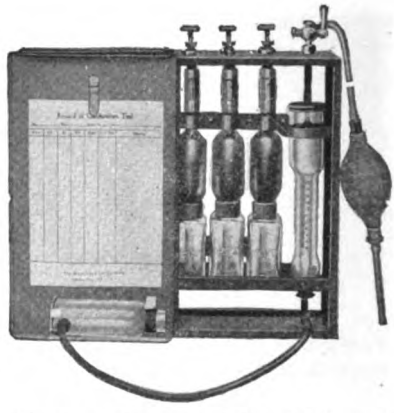


Hays Automatic CO_2 and Draft Recorder
Awarded Certificate of Merit by Franklin Institute

The Hays Automatic CO_2 and Draft Recorder tells the complete story about how fuel is burned. Thousands are in use in plants burning, coal, oil and gas. Some of the features are: small lag; accurate to $^5/_{10}$ of 1%; no wearing surface; operated by columns of water, mercury and gas; gas drawn from boiler continuously; machine trapping off fresh sample periodically; self adjusting mercury valve keeps water at proper level; machine automatically controls pressure and temperature of gas; rapid and complete absorption (steel wool method); analysis every 2½ minutes; visible operation—strong moulded glass like gage glass used in important places, with packing nut connections; draft record on same chart with CO_2 adds "why" to "what;" low efficiency alarm rings bell, or lights light to warn fireman, engineers, superintendent, etc., when efficiency is low; automatic pen lifter releases pens from chart when desired, making it impossible to spoil chart; low cost of maintenance and operation.

Catalog on request.

HAYS IMPROVED GAS ANALYZER:



The Hays Improved Gas Analyzer (16 models for various purposes) represents the highest development in hand analyzers. No troublesome pinch clamps, no frail glass cocks, but metal needle valves with renewable seats instead. The Hays patented steel wool method of absorption is the most rapid and satisfactory known. (CO_2 analysis in 30 seconds, complete analysis for CO_2, CO and O_2 in 3½ minutes.) We can furnish neat carrying case for Consulting or Service Engineers.

Literature on request.

Publishers of "*How to Build up Furnace Efficiency*" by Jos. W. Hays.

16th Ed. just off the press. $1.00 postpaid.

Digitized by Google

MONO CORPORATION OF AMERICA

25 WEST BROADWAY, NEW YORK CITY

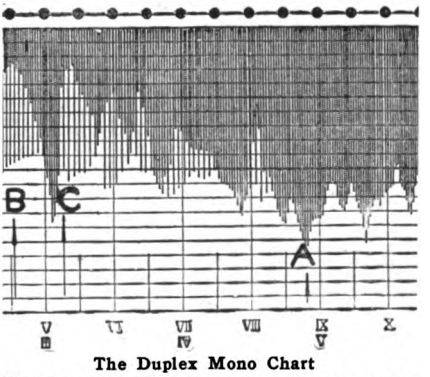
Manufacturers of the Duplex Mono, a Double Recording (CO_2 and Combustible Gases) Instrument for Combustion Control and Other Automatic, Continuously Recording Gas Analyzing Instruments for CO_2, CO, O_2, H_2, SO_2, Cl_2, Etc.

Mono Automatic Gas-Analyzing Instruments produce continuous graphic records of the percentages of certain gases, such as CO_2, CO, O_2, H_2, SO_2, CH_4, N_2, etc., present in varying gas mixtures. They promote economy in fuel consumption in boiler and gas producer plants and are also used to control chemical reactions in sulphite mills, lime and brick kilns, porcelain factories and chemical process work of all kinds.



The Duplex Mono
Automatic, Double Recording Gas Analyzing Machine

The Duplex Mono not only accurately analyzes and records the percentages of CO_2 present at all times in flue gases, but also promptly detects and clearly records combustible gases on one and the same chart, whenever they appear. Too much air unnecessarily increases the volume of flue gases, which carry away sensible heat, while too little air results in the far more serious condition of incomplete combustion. With the Duplex Mono as a guide, maximum fuel economy is obtainable because combustion can always be carried on with the least supply of air possible without incurring the heavy losses incidental to the escape of combustible gases up the flue.



The Duplex Mono Chart
The clear space from the bottom up represents CO_2 in the flue gases. The lightly shaded areas between the white space and the heavily shaded area indicates the presence of combustible gases.

Mono instruments consist of an analyzing and recording apparatus inclosed in a dust-proof, cast iron case (see illustration), two gas filters, filling device, a water filter, and the connecting gas and water tubing, in addition to which the Duplex Mono has a small furnace mounted on the top. They are operated by either air or water pressure of about 10 pounds per square inch according to local conditions. They are extremely accurate, and can make 40 analyses per hour, with a lag of only three minutes between the time of drawing a given sample and recording the same, when the distance from the source to the instrument is about 60 feet. A variety of ranges are offered and range shifters can be furnished.

There are no mechanical valves or pistons inside the case, and replenishing of ink, paper, chemicals and the winding of the clock need be attended to only at intervals of from 1 to 8 weeks.

Our engineers and experts are at your service to explain the purpose and demonstrate the operation and results to be accomplished through the use of Mono instruments at any time. You are invited to consult us on any special combustion or chemical problem you may have in mind involving gas analysis.

Write for descriptive bulletin.

Digitized by Google

PRECISION INSTRUMENT CO.

NEWARK, NEW JERSEY



CO_2 RECORDER:
(24 Hour Chart)

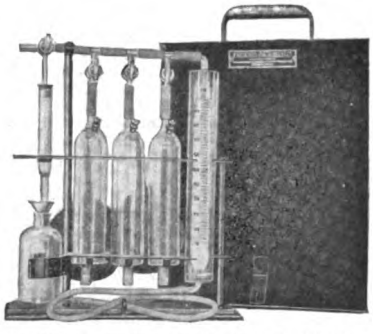
We make recorders to work against a vacuum of 18 inches of water.

Standard range 0–20 per cent.

Other ranges up to 100 per cent.

Accurate to ½ of 1 per cent.

We also make 60-day tape combined CO_2 and draft recorders.



PRECISION FLUE GAS ANALYZERS OR ORSATS:

Supplied in 50 cc or 100 cc with any number of pipettes from one to meet your requirements.

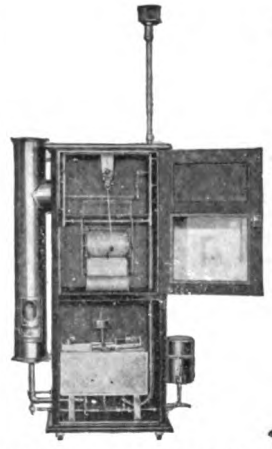


COAL CALORIMETER:

For the determination of the BTU's of the coal you burn. Simple in operation, dependable in use.

PRECISION LABORATORY GAS TEST METERS have some new features which are worthy of attention. Write for details.

We also supply:
Air Speed Meters
Pressure Gages for Dirigibles
Mercury Column Gauges
Gas Collectors
Efficiency Kits
Chemical Glassware



PRECISION RECORDING CALOR-GRAPH OR CALORIMETER:

Gives the permanent record on a 60-day chart of the BTU's of any gas. Patents pending.



PRECISION IMPROVED TYPE S & A GRAVITOMETERS:

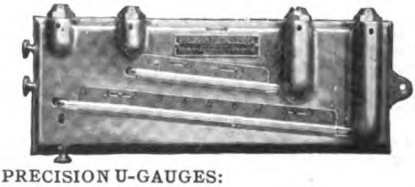
Give the permanent record on a 24-hour disc or drum chart of the Specific Gravity of any gas. Supplied also in the Indicating type.



COMBINED INDICATING AND RECORDING GAUGE:
(Pressure or Draft)

Has an indicating scale for the operating man and a 60-day tape recording chart giving a permanent record.

DRAFT GAUGE:
(Double or Single Types)



PRECISION U-GAUGES:

Sliding scales and leveling device for micrometer adjustment.

Are made in all types, and all sizes, for either inches of water, mercury, or millimeters of kerosene.

Digitized by Google

PRECISION INSTRUMENT CO. NEWARK, N. J.



"3 IN 1" DRAFT GAUGE:

For forced draft, stoker fired boilers. Gives pressure in wind box, draft over fuel bed, and draft at last pass. Length 20½ inches. Diaphragm type of gauge. Guaranteed to be accurate at all points of scale. Protected by Patent.



"4 IN 1" DRAFT GAUGE:

Designed for Boilers equipped with Stokers having 2 air compartments or with Economizers using induced draft. Protected by Patent.



"5 IN 1" DRAFT GAUGES:

Designed for Boilers equipped with Caxe or Harrington Stokers where there are three wind boxes.

Protected by Patent.



"2 IN 1" DRAFT GAUGES:

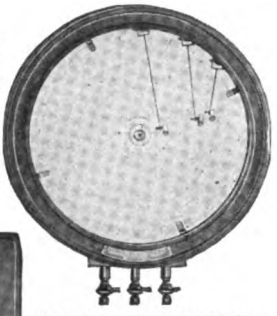
Designed for Boilers using natural draft burning either coal or oil.

Protected by Patent.

Any ranges to meet your requirements.

"3 IN 1" RECORDING DRAFT GAUGE:

Gives the permanent record on a 24-hour chart of the drafts of your stoker fired Boiler.





"2 IN 1" DRAFT GAUGE:
(Recording)

Gives the superintendent or chief engineer a permanent record of draft conditions of your hand fired Boilers.

"PRECISION SINGLE INDICATORS" for indicating the draft or pressure at any point. Range from one-half inch to 300 pounds.





PRECISION SINGLE RECORDERS, 24-hour or 7-day. On an 8- or 12-inch chart. All ranges. Accuracy guaranteed.

TAPE RECORDING GAUGE:
(Pressure or Draft)

Gives record on 60-day chart. All Precision gauges are equipped with patented dead heat pen movement and are guaranteed to be accurate at all points of scale.



Precision Gauges are Calibrated to inches of water, mercury or millimeters to meet your requirements. They are guaranteed and dependable; once used always used. Ask the man who has them.

Digitized by Google

UEHLING INSTRUMENT COMPANY

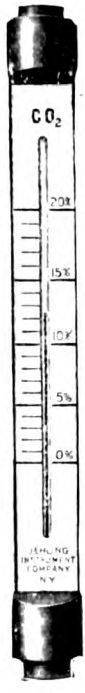
2011 EMPIRE BUILDING, NEW YORK CITY
Cable Address "Uehlinco"

Manufacturing Engineers—Combustion Economists

UEHLING CO_2 RECORDERS:



UEHLING
CO_2 RECORDER
No Chemical
Solutions



CO_2
Indicator
for Boiler
Front

Uehling CO_2 Equipment provides the means for obtaining and maintaining high boiler efficiency. Such equipment consists of the **Instrument Proper,** which can be located in the engine room or any other convenient part of the plant, the **Recording Gauge,** which can be located in the office of the Chief Engineer or Superintendent, and the **Auxiliary CO_2 Indicator,** which can be located at the boiler front to serve as a working guide for the fireman. By means of the Indicator the fireman can be held responsible for the fuel wasted up the chimney, just the same as he is held responsible for an even steam pressure by means of the steam gauge.

SEE OUR ADVTS. IN MECHANICAL ENGINEERING THE JOURNAL OF THE A.S.M.E.

The per cent of CO_2 in the products of combustion is a true index of the excess air used; the lower the per cent of CO_2 the greater the volume of products of combustion per pound of fuel consumed; since all gases leave the boiler at stack temperature the per cent of CO_2 in the products of combustion bears a direct relation to the sensible heat wasted up the chimney.

OTHER UEHLING INSTRUMENTS:

Uehling Draft Recording Gauge.
Uehling Differential Draft Recorder.
Uehling Draft Indicator.
Uehling Differential Draft Indicator.
Uehling Draft Analyzer.
Uehling Light Pressure and Vacuum Recorder.
Uehling Vacuum Recorder.
Uehling Combined Barometer and Vacuum Recorder.
Uehling Absolute Pressure Indicator.
Uehling Pneumatic Pyrometer.
Uehling Revolution Recorder.

The distinctive features of Uehling Recording Instruments are *Simplicity, Accuracy* and *Reliability.* They are based on the *hydrostatic principle,* by the application of which all springs, levers and joint movements are avoided.

In addition to these important advantages, the hydrostatic principle permits of making the scale open between the limits where the readings are important, and narrow where they are unimportant, or eliminating that part of the scale altogether which is of no use, thus utilizing the whole width of the chart for important readings.

Send for Catalogs and booklet "Combustion and the Cost of Power."

Check FUEL WASTE

Digitized by Google

THE ASHTON VALVE COMPANY

161 First St., CAMBRIDGE, BOSTON, MASS.

BRANCH OFFICES

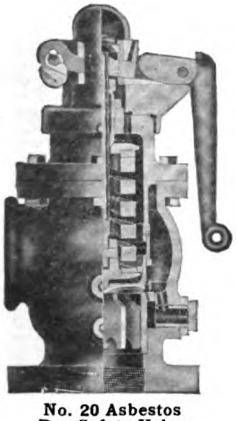
126 Liberty St., New York — 318 W. Washington St., Chicago, Ill.

606 Howard St., San Francisco, Cal.

Manufacturers of Pop Safety Valves, Pressure and Vacuum Gages and Kindred Engineering Specialties

THE ASHTON IMPROVED POP SAFETY VALVE:

Embodies the latest improvements in the state of the Art and has been the acknowledged Quality Standard among Engineers for the past 50 years. When of proper size Ashton Valves give prompt and full relief to a boiler and prevent any accumulation of pressure above the point at which they are set. They are reliable and sensitive in action, and operate with a uniform and only moderate blow back, thereby showing greatest economy in both fuel and steam. They are solid in construction with all working parts of high grade material insuring most durable service and lowest cost of maintenance.



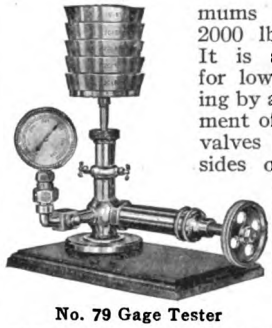
No. 20 Asbestos Pop Safety Valve

Ashton Pop Safety Valves are made to give any desired capacity of relief, and when so specified are furnished to fully comply with the requirements of the A. S. M. E. Boiler Code, as well as any special state or local regulations.

THE ASHTON IMPROVED DEAD WEIGHT PRESSURE GAGE TESTER:

Offers the most modern method for obtaining an accurate test of pressure gages by means of weights. It is convenient in form and readily portable, being packed in two separate cases with locked covers and furnished with substantial handles.

The style illustrated with double area piston requires only one-fourth the usual number of weights and is suitable for high pressure testing up to various maximums from 200 to 2000 lbs. per sq. in. It is also adaptable for low pressure testing by a simple adjustment of the two small valves on opposite sides of the vertical cylinder, which can readily be done while the machine is in use.



No. 79 Gage Tester

THE ASHTON IMPROVED PRESSURE AND VACUUM GAGES:

Are made for all kinds of service in either plain registering or recording styles, and of either single or double spring construction. The springs are of best quality seamless drawn tubing, the movements non-corrosive with nickel-silver pinions and arbors, and the dials accurately graduated.



No. 74 Recording Gage

Ashton Recording Gages as illustrated give a daily record on paper charts showing all pressure variations both day and night, giving the time and length of every change, thus assuring careful firing, steady pressure, and highest efficiency and economy. Each gage is furnished with one year's supply of charts, ink and pen filler.

Our finely illustrated No. 184 catalogue of 176 pages tells all about the full line of Ashton Specialties. Write for it NOW.

SEE OUR ADVTS. IN MECHANICAL ENGINEERING THE JOURNAL OF THE A.S.M.E.

Digitized by Google

CROSBY STEAM GAGE & VALVE CO.

EXECUTIVE OFFICES
40 CENTRAL ST., BOSTON, MASS.

STORES: BOSTON, 38 Central Street — NEW YORK, 100 Walker St.
CHICAGO, 180 No. Market Street — SAN FRANCISCO, 121 Second St.
LONDON, ENG., 147 Queen Victoria St.

Manufacturers of Standard Steam Appliances

We present for the consideration of Mechanical Engineers certain instruments of our manufacture which we believe are scientifically and mechanically the best of their kind yet produced.

GAGES:



Crosby Pressure Gage

For any and all purposes:

REVOLUTION COUNTERS:

Positive in action, reliable, durable.

An instrument of wide application and of the greatest usefulness to engineers.

GAGE TESTING INSTRUMENT:



Crosby Pressure Gage Tester

Made on scientific principles and is mathematically correct.

RECORDING GAGES:

A Dependable Instrument for Accuracy and Service. Jewelled Clock Movement, Recording Pressure, Vacuum Hydraulic, Daily, Weekly, Continuous Records.



Crosby Recorder

INDICATORS:

Steam, Gas, Hydraulic, etc.

As perfect in workmanship and operation as human skill can devise.



Crosby New Indicator

Also Lanza Continuous Diagram Appliance—Reducing Wheels—Boiler Test Pumps—Vacuum Pumps—Planimeters—Electrically Operated Chime Whistles—

All CROSBY Quality.

Address any of our stores and you will receive a prompt and courteous reply.

SEE OUR ADVTS. IN MECHANICAL ENGINEERING THE JOURNAL OF THE A.S.M.E.

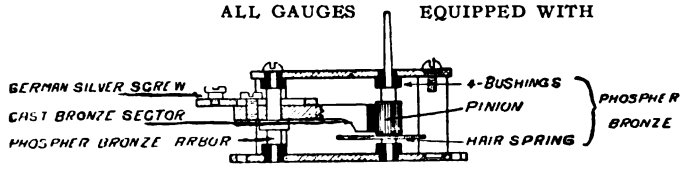
(*See page 202 for additional products of this Company*)

Digitized by Google

J. E. LONERGAN CO.

211–215 RACE ST., PHILADELPHIA, PA.

Manufacturers of Boiler, Steam and Gas Engine Specialties



Non-Corrosive Movement—Sectional View

QUALITY TRADE Lonergan MARK GAUGES

Pressure Gauges for steam, water or air, or vacuum. Pressure gauges gradu-



Pressure Gauge

ated to any pressure not exceeding 500 lbs. Vacuum gauges graduated to 30″.

Type "D" Short Spring, strong, non-freezable.

Model "GAS" Short Spring, strong, non-freezable, with Auxiliary Helical Spring attached to end of main spring, lengthening life of gauge where fluctuation of pressure or vibration is excessive.

Model "GDS" Double Spring, strong, non-freezable, made of one piece of seamless drawn bourdon tubing, insuring accuracy.

Pressure and Vacuum Gauge: Generally used on Compound Engines, Receivers and Heating Systems.

"Combination" Water Works Gauge: Used to indicate pressure of water per square inch and corresponding height of column of water in feet. Adapted for use in Water Works, Pumping Stations, Mines, Stand Pipes, etc.

"Altitude" Gauge: Used to indicate height of water in feet in tanks, reservoirs and in connection with Hot-Water House-heating Systems. Are generally graduated to 70 feet.

Double and Auxiliary Spring "Locomotive" Gauges.

"Tractor Engine" Gauges: Generally graduated to 300 lbs.

"Ammonia" Gauge: Made expressly for use with ammonia and other liquids affecting brass. Tubes are made of a



Ammonia Gauge

very high-grade steel and carefully tempered. For use on ice and refrigerating machines.



Hydraulic Gauge

"Hydraulic" Gauge: Can be graduated to any pressure not exceeding 20,000 lbs. per square inch.

Mechanical Men simply read our SPECIFICATIONS and are convinced.

"Movement" for all of our high-grade gauges

All wearing bearings have PHOSPHOR BRONZE BUSHINGS twice their diameter in length.

Sector, cast bronze, with face three times as wide as the regular sector.

Pinion, Arbor and Hair Spring, made of PHOSPHOR BRONZE.

This insures a gauge with exceptional wearing qualities, long life and accuracy.

"Springs" made for hard work.

Sector suspended vertically which reduces wear on teeth of sector and pinion to a minimum.

"Dials" all graduated by hand, made of brass, silver plated with black lettering.

(See page 203 for additional products of this Company)

Digitized by Google

UNITED STATES GAUGE CO.

44 BEAVER ST., NEW YORK, N. Y.
WORKS: SELLERSVILLE, PA.

CHICAGO BOSTON DETROIT PHILADELPHIA
SAN FRANCISCO BIRMINGHAM NEW ORLEANS MONTREAL

Manufacturers of Pressure, Vacuum and Recording Gauges

FLANGED CASE WITH FLARE RING:



Fig. 500

Illustrates standard case with back flange, flare ring; are made both in iron and brass. Sizes 2″, 2½″, 3″, 3½″, 4½″, 5″, 6″, 6¾″, 8″, 8½″, 10″ and 12″.

290

U. S. gauges have independent, non-corrosive movements and embody exclusive patented features.

Dials, furnished in silver or white, in any standard graduations up to 1000 lbs. Graduations should always be double the average maximum working pressure.

Lower connection is standard. Connection can be made at back of case. Sizes to 6″ have ¼ inch male pipe connection—larger ¼ inch female.

Iron case gauges are black japanned and can have either polished brass or nickel-plated ring. Cast brass case gauges finished in polished brass or nickel-plated.

Case can be furnished with close fitting ring as shown on 522-A.

State if for use with air, gas, oil, water, steam, ammonia, etc.

CAST BRASS CASE AND RING:

Fig. 548

Made in 2½″, 3″, and 3½″. Cast brass case, screw ring; bevelled glass. Can be furnished in any standard pressure. ¼ inch lower male connection. Finished in either polished brass or nickel-plated.



Fig. 548

PRESSED METAL CASE AND RING:

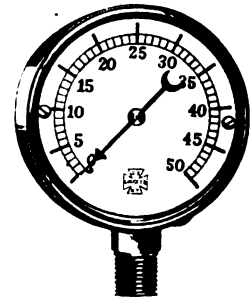


Fig. 522-A

This design was created to meet an international demand for a sturdy instrument when no flange on case is necessary. Made in pressed steel, pressed brass or iron case—with close fitting ring.

In pressed steel the following sizes—2″, 2½″, 3″, 3½″, 4½″ and 5″.

In pressed brass 2″, 2½″, 3″ and 3½″.

In cast iron 2″, 2½″, 3″, 3½″, 4½″ and 5″, furnished only with round socket connections.

In any standard pressures. Small extra charge when pressures exceed 500 lbs.

Standard connection ⅛″ male for 2″; ¼″ male pipe connection for larger sizes mentioned.

Finish of iron and steel case gauges, black japanned case and ring, or black japanned case with either polished brass or nickel-plated ring, as specified. Brass case gauges can be polished brass or nickel-plated.

Digitized by Google

THE BRISTOL COMPANY

WATERBURY, CONN., U. S. A.

BOSTON, Old South Bldg. NEW YORK, 114 Liberty St. PITTSBURGH, Frick Bldg. DETROIT, Book Bldg. ST. LOUIS, Boatmens Bank Bldg. CHICAGO, Monadnock Bldg. SAN FRANCISCO, Rialto Bldg.

Manufacturers of Bristol Recording Instruments for Pressure, Temperature, Electricity, Motion, Time, Speed, Etc.

BRISTOL'S RECORDING GAUGES:

For steam, air, gas and liquids. For all ranges of pressure and vacuum.

BRISTOL'S RECORDING LIQUID LEVEL GAUGES:

For automatically recording depths or levels of water or other liquids.



Recording Gauge

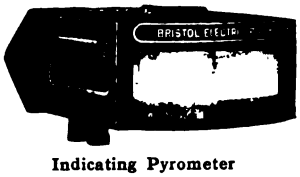
BRISTOL'S RECORDING THERMOMETERS:

For all commercial ranges of temperature from 60° below zero to 800° Fahrenheit.



Recording Thermometer

BRISTOL'S INDICATING ELECTRIC PYROMETERS:



Indicating Pyrometer

High resistance model, for measuring temperatures up to 3000° F.

BRISTOL'S RECORDING PYROMETERS:

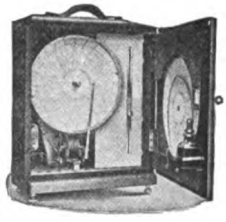
High Resistance Model for recording temperatures up to 3000° F.



Recording Pyrometer

BRISTOL'S RECORDING VOLTMETERS, AMMETERS AND WATTMETERS:

For all ranges of A. C. and D. C. Can be furnished for switchboard or portable service.



Portable Voltmeter

BRISTOL'S ELECTRICAL AND MECHANICAL OPERATION RECORDERS:

For recording time of mechanical movements, machine operation, valve reversals, etc.



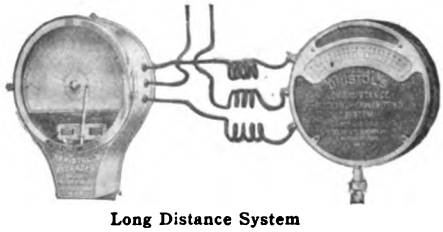
Operation Recorder

BRISTOL'S ELECTRIC TEMPERATURE CONTROLLER:

For measuring and controlling temperatures in gas and electric furnaces, etc.



Temperature Controller



Long Distance System

BRISTOL'S PATENTED LONG DISTANCE ELECTRIC TRANSMITTING AND RECORDING SYSTEM:

For measuring and recording at remote points, pressure, liquid level, temperature and motion. For instance, records may be transmitted over distances of five miles or more.

Digitized by Google

THE BROWN INSTRUMENT CO.

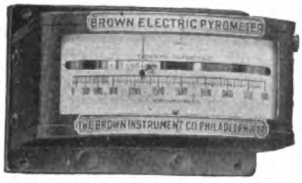
PHILADELPHIA, PA.

NEW YORK PITTSBURGH DETROIT CHICAGO ST. LOUIS
DENVER SAN FRANCISCO LOS ANGELES MONTREAL

Manufacturers of Pyrometers, Thermometers, Tachometers, Time and Operation Recorders, Recording Gauges

BROWN PYROMETERS:

Operate on the thermo-electric principle. Adapted for all ranges of temperatures from 300° F. to 3000° F. For temperatures below 300° F., Brown Resistance Thermometers are recommended. For temperatures above 3000° F., the Brown Radiation Pyrometer is used.



The Brown High Resistance Indicating Pyrometer

BROWN RECORDING PYROMETERS:



Make a permanent record of temperatures—single or multiple charts. Brown Pyrometers are also made to regulate or control automatically the temperature of electric, gas or oil furnaces.

The Brown Duplex Continuous Recording Pyrometer

BROWN LONG DISTANCE RECORDING THERMOMETERS:

These instruments accurately record temperatures up to 1000° Fahr. or 500° Cent. Operate on the well-known principle of the expansion of gas or liquid with change of temperature. Capillary tubing can be 100 ft. Fitted with flexible steel-armored tubing. Bulbs have been developed for every purpose.



The Brown Recording Thermometer

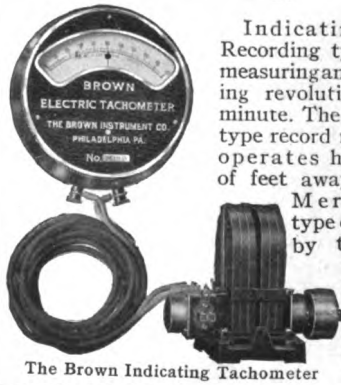
BROWN RECORDING PRESSURE GAUGE:



The Brown Recording Pressure Gauge

For recording all ranges of vacuum and pressure from a few ounces of water to 5000 lbs., Brown Recording Pressure Gauges are guaranteed completely as to dependability and accuracy.

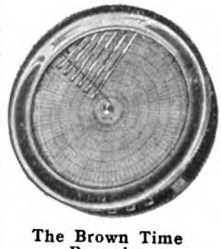
BROWN TACHOMETERS:



The Brown Indicating Tachometer

Indicating and Recording types for measuring and covnting revolutions per minute. The Electric type record machine operates hundreds of feet away. The Mercurial type operates by the unvarying law of centrifugal force.

BROWN TIME RECORDERS:



The Brown Time Recorder

Extensively used for recording the time of operation of machinery, switches, valves, pumps, and for recording the reversals of glass melting tanks, open hearth furnaces and annealing furnaces; also for recording the time of starting and stopping of paper machines and other devices.

OTHER SCIENTIFIC INSTRUMENTS:

Resistance Thermometers, Thermometers of the Mercurial type, Recording Gauges, Temperature Controllers, and Vacuum Gauges are among other scientific instruments produced in our Laboratory, Wayne Junction, Philadelphia, where visitors are always most welcome.

Digitized by Google

THE FOXBORO CO., INC.

FOXBORO, MASS.

Indicating, Recording and Controlling Instruments for Pressure, Temperature, Speed, Time and Flow

NEW YORK CHICAGO PHILADELPHIA PITTSBURGH BIRMINGHAM SAN FRANCISCO TULSA

FOXBORO

FOXBORO-HEATH CO_2 RECORDERS:

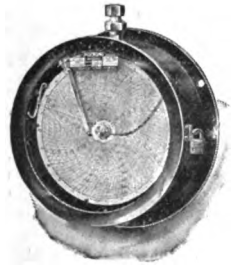


These recorders are operated by water syphon with a minimum lag between stack and instrument.

Simple in operation. Make a complete flue gas analysis every three or four minutes. Record shows percentage of CO_2. A practical and dependable instrument.

FOXBORO RECORDING GAUGES:

New inverted type will not allow ink to run down pen arm and blot the record.



Any range from full vacuum to 20,000 lbs. per square inch. For Steam, Gas, Water, Oil, Air, Brine, Ammonia—in fact, anything under Pressure or Vacuum.

FOXBORO RECORDING THERMOMETERS:

These depend upon expansion of liquids, gas, and the vapor tension of volatile liquids for their action.

Adapted for any operation where an accurate knowledge of temperature is needed. Any range from −60° to+1000° Fht., or equivalent degrees in Centigrade and Reaumur. No multiplying devices used. Permanency guaranteed.



293

FOXBORO LIQUID LEVEL RECORDERS:

Built primarily for recording varying levels of rivers, reservoirs, canals, forebays, tail-races, etc. Have been widely adopted for sewer work, weir measurements, specific gravity recorders.



Many large Paper Mills use them on their Jordan Stuff Chests to get closer weights and more uniform products.

SEE OUR ADVTS IN MECHANICAL ENGINEERING THE JOURNAL OF THE A.S.M.E.

Write for Bulletins.

Digitized by Google

THE MOTO-METER CO., INC.

LONG ISLAND CITY, N. Y.

Manufacturers of Industrial Thermometers

BOYCE MOTO METER

PRODUCTS:
Indicating thermometers of Distance Type and Industrial Type.

HISTORY: The Moto-Meter Company, Inc., is the pioneer manufacturer of motor heat indicators for both U. S. Army and Navy airplanes. This severe service enabled us to develop in co-operation with the U. S. Bureau of Standards, Distance Type or Industrial Type thermometers of especially rugged construction.

USE AND APPLICATION: These thermometers indicate temperatures of vats, ovens, drying rooms, shaft bearings, powder magazines, coal piles, kettles, pasteurizers, electric transformers, internal combustion motors of airplanes, motor boats or automobiles. They show accurate temperature on the dial (temperature range from —40° F. to +400° F.) located from 5 inches to 30 feet away from the object tested. Short rigid instruments of the Industrial Type may be used in place of glass thermometers.

CONSTRUCTION: An alcohol filled helical spring of Bourdon tubing giving the entire temperature range which entirely eliminates all gears, levers, hair springs and other delicate parts, assuring extreme accuracy, long life, and the smooth unbroken movement of the pointer. Unaffected by vibration or altitude, and fully compensated against changes of atmospheric temperature.

294



MODEL "A"

for

AUTOMOBILES,

TRUCKS and

TRACTORS

MODEL "A:" Especially developed for indicating cooling water, temperature of tractors, trucks or automobiles, where a dashboard installation is desired; or suited for indicating any temperature from 32° F. to 212° F.

Finish—Black enamel case, nickel-plated retaining ring, heavy bevelled crystal, black dial with white figures, and red and white pointer.
Size—Diameter of head 3 ⅛".
Weight—Head of instrument—16 ounces.
Price—Model "A," with standard 5 feet of heavy nickel tubing $18.00.*

MODEL "A"

MARINE TYPE

for

MOTOR BOATS



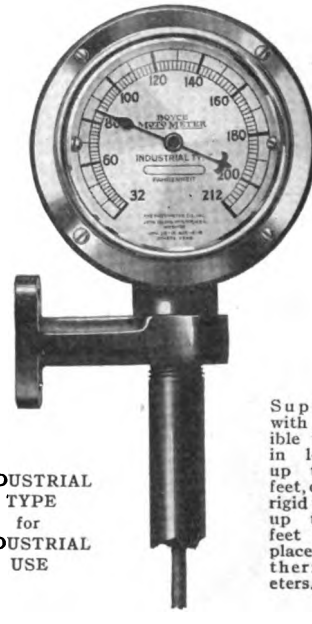
Similar to regular Model "A" (see above) except in size of head.
Finish—Nickel or brass retaining ring, heavy bevelled crystal, black dial with white figures, and red and white pointer.
Size—Diameter of head—2⅝".
Weight—Head of instrument—9 oz.
Price—Marine Type Model "A" with standard 5 feet of heavy nickel-plated tubing—$18.00.*

MODEL "C"



For AIRPLANES

MODEL "C:" Recommended for airplane installations where light weight and full concentric movement are desirable. This instrument is an exact duplicate of the latest type supplied on Army and Navy Planes.
Temperature Range—32° to 212° F. (freezing to boiling).
Finish—Case made of aluminum with black enamel finish with brass bezel ring, nickel-plated.
Size—Diameter of flange, 3⅛ inches.
Weight—Head of instrument, 12 ounces.
Standard Length of Tubing—12 feet, 6 inches of ⅛ inch copper tubing heavily nickel-plated.
Price—Model "C" with standard length of tubing complete, $30.00.*



INDUSTRIAL TYPE for INDUSTRIAL USE

Supplied with flexible tubing in lengths up to 30 feet, or with rigid tubing up to 30 feet to replace glass thermometers.

Finish—Black enamel case, nickel-plated retaining ring, heavy bevelled crystal, white dial with black figures and black pointer.
Size—Diameter of head—5".
Weight—Head of instrument 1½ lbs.
Price—From $12.00 to $15.00* (in our standardized lengths only).

*Prices for extra length tubing on application.

Digitized by Google

THE SCHAEFFER & BUDENBERG MFG. CO.

BROOKLYN, NEW YORK

ATLANTA CHICAGO DETROIT LOS ANGELES PHILADELPHIA PITTSBURGH SAN FRANCISCO WASHINGTON

Instruments for Measuring, Indicating, and Recording Temperature, Pressure and Speed

S & B GAUGES:

A complete line of Pressure, Vacuum and Draft Gauges for all requirements, also Column Gauges, Mercury Pressure and Vacuum Gauges, Gauge Testers, etc.

"CRESCENT" THERMOMETERS:



"Crescent" Thermometer

"Crescent" Thermometers are made for practically every purpose. Handsome in appearance and perfect in mechanical detail and construction.

Specify size of scale case desired, graduation, character and size of connection, character and length of stem, and the purpose for which the thermometer is to be used.

Write for Catalog F-1.

"REFORM" THERMOMETERS:



"Reform" Thermometer

A dial face, mercury-filled indicating thermometer having the accuracy of the standard glass tube thermometer and the reading convenience of a dial face. Entire working mechanism is made of steel, meaning long life. Standard size of dial, 6 inches. Other sizes made to order. Furnished with either rigid connection or flexible capillary steel tube connection. The latter greatly facilitates installation. State the graduation desired, character and length of connection and the purpose for which the thermometer is to be used.

Write for Catalog G-1.

"COLUMBIA" RECORDING THERMOMETERS:

"Columbia" Recording Thermometers give authentic records of temperature up to 1000° Fahr.

Three types, actuated by either mercury, gas or vapor tension.

Clock movement is ruggedly built, for long service. Will not corrode. Responds instantly to the slightest temperature changes and guaranteed accurate.

Time Punch makes a small hole in disc at exact time button is pressed, thus acting as a time clock.

Removable arm makes renewal of chart easy and eliminates the possibility of straining arm and affecting accuracy of records.

Renewable glass non-spilling and non-corroding pen insures dependable, readable records. Day and night chart has wider area than usual ,giving a more readable record.



"Columbia" Recording Thermometer

Tubing is fume, acid and water proof and practically indestructible.

Made in two sizes, 8" and 12", respectively, for 24 hours or 7 days. Furnished with either rigid connection or flexible connecting tubing of any length. State size of chart and graduation, length and character of connection and purpose for which the recorder is to be used.

Write for Catalog H-1

"COLUMBIA" RECORDING GAUGE:



"Columbia Recording" Gauge

Being non-corrosive and especially rugged in construction, the clock movement in these gauges will outwear any other make.

Time Punch makes a small hole in disc at exact time the button is pressed, thus acting as a time clock.

Removable arm makes it easy to renew chart. No danger of straining arm and affecting accuracy of record.

Pen is of glass and can be renewed. It cannot corrode nor leak.

Day and night records are more easily read than on other makes due to wider area.

In portable and stationary types, for 8" and 12" day and night charts, respectively, making one revolution in 24 hours or 7 days as desired.

State size of chart and graduations, and the purpose for which used.

Write for Catalog E-1.

295

"COLUMBIA" TACHOMETERS:



"Columbia" Tachometer

We have a most complete line of Hand and Stationary Tachometers covering every requirement met with in practice. Constructed on the most modern principles. Accuracy guaranteed. Compact and durable in construction, perfect in mechanical detail and handsome in appearance.

State desired graduations and if Stationary Type Tachometer is wanted, the diameter and the normal speed of the shaft you will drive from.

Write for Catalog K-1.

S & B CALORIMETERS:



Calorimeter

We manufacture Professor Carpenter's pattern Calorimeters for Steam. The throttling type of Steam Calorimeter serves for determining the amount of moisture contained in steam by measurement of the heat. The separating type is designed to show the percentage of water by mechanical separation of the water from the steam.

S & B Calorimeters are easily operated, requiring no technical knowledge, and results are most satisfactory for practical problems.

Write for Catalog M-1.

SEE OUR ADVTS. IN MECHANICAL ENGINEERING THE JOURNAL OF THE A.S.M.E.

Digitized by Google

C. J. TAGLIABUE MFG. CO.

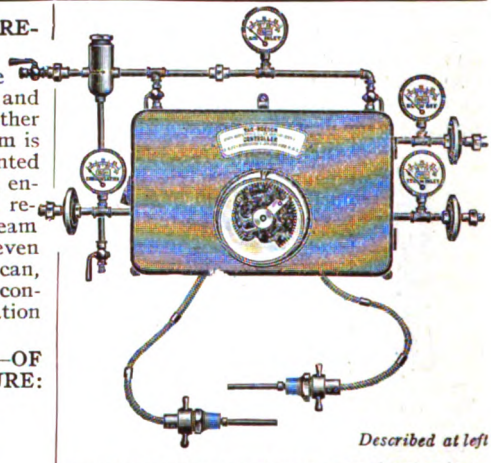
18 to 88 THIRTY-THIRD STREET, BROOKLYN, N. Y.

BOSTON CHICAGO PITTSBURGH TULSA SAN FRANCISCO

Manufacturers of Automatic Controllers for Temperature, Humidity, Pressure, Time, Liquid Level, and Condensation; Indicating and Recording Thermometers; Hydrometers; Mercurial Gages; Oil Testing Instruments; Etc.

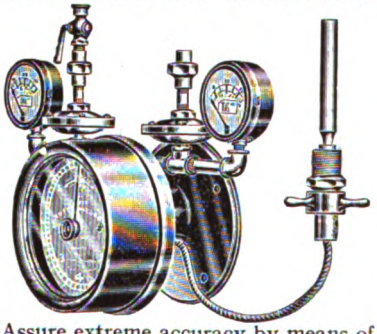
TAG-ROESCH TIME-TEMPERATURE-CONDENSATION CONTROLLER:

Automatically increases temperature to desired point in certain period of time and holds it uniform at this point for another time period. At end of process, steam is automatically shut off, apparatus is vented and cooling water is admitted. During entire operation, condensation feature removes all condensation and wet steam from the apparatus, thus insuring an even temperature throughout. Controller can, however, be furnished without this condensation feature. Complete information in Catalog A-460.

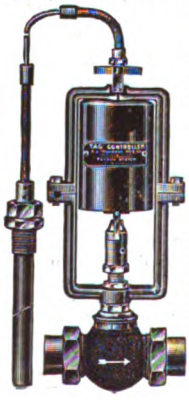


Described at left

TAG PERFECT CONTROLLERS—OF TEMPERATURE AND OF PRESSURE:



Assure extreme accuracy by means of a very sensitive controller mechanism which regulates the admission of heating or cooling medium by an air-operated diaphragm-motor valve. Temperature ranges between —40 and 900° F., pressure ½ lb. to 400 lbs. Complete information in Catalog A-425.



TAG SELF-OPERATING CONTROLLERS—OF TEMPERATURE AND OF PRESSURE:

Are so termed because they require no auxiliary motive power. These controllers are unaffected by vibration, and can be applied at or near the apparatus vertically or horizontally. This type combines accuracy with simplicity, rugged construction and ease of installation. Temperature ranges betwen 95° to 290° F., pressure, 2 lbs. to 70 lbs. Catalog A-630 and A-988.

TAG RECORDING THERMOMETERS:

Are of improved design, embodying distinctive features which assure maximum sensitiveness, accuracy, durability, and operating convenience. New catalog in preparation.

CHEMICAL OR LABORATORY THERMOMETERS:

Complete information in Catalog A-416.

TAG INDUSTRIAL THERMOMETERS:

Are an absolute requirement wherever accurate temperature indications are an important factor. TAG Thermometers are of guaranteed permanent accuracy, of extreme sensitiveness and of rugged, durable construction. These thermometers can be furnished with straight or angle stems, with fixed, adjustable, union or separable connections and with any desired scale range between —60° and 1000° F. or equivalent. Complete information in Catalog A-625.



HYDROMETERS:

Complete information in Catalog A-415.

TAG AND SAYBOLT OIL-TESTING INSTRUMENTS:

Described in Catalog A-598.

Digitized by Google

PNEUMERCATOR COMPANY, INC.

15 PARK ROW, NEW YORK, N. Y.

PRODUCT AND SERVICE:

Pneumercator Gauges indicate the depth and weight or volume, specific gravity, or Baumé of any liquid, fluid or viscous, acid or alkaline at any temperature.

USE:

Tanks, Standpipes and Reservoirs. A Pneumercator Gauge installed in any tank will provide a perpetual inventory of the liquid stored, put in or withdrawn.

It will operate with equal accuracy on tanks open to the atmosphere or under pressure or vacuum, and its accuracy is not affected by changes of temperature of the liquid or of the buildings through which the connecting pipe passes.

There are no floats, diaphragms or delicate mechanisms to stick or get out of order.

APPLICATIONS:

Fuel, oil, gasoline, acid, chemical, sprinkler tanks, reservoirs, standpipes, flumes, tail race, dams, water works, tide fluctuations, etc.



PRINCIPLE:

The operation of all models of "Pneumercator" Gauges is based on the maintenance of a true hydrostatic balance between the head of the liquid to be measured and a column of mercury or other indicating medium, the pressure being transmitted by air confined in a small connecting tube between the liquid and the gauge.

CONSTRUCTION:

1. A balance chamber or chambers, located in the liquid to be measured.

2. A mercury or other gauge, located wherever it is desired to take readings.

3. A hand pump or other source of compressed air.

4. A control valve attached to the gauge and connected by small piping to the balance chamber and to the source of compressed air.

QUOTATION:

As each "Pneumercator" Gauge has to be made up for the specific purpose for which it is to be used, in order to advise and quote you intelligently it is necessary that we have the following information:

The dimensions of tank (or tanks).
The distance from the tank to the point where the indicating section of the instrument is to be located.
The nature and specific gravity of the liquid to be measured.

Prices and full information will be promptly furnished on request.

Notice:

The coined word "Pneumercator" is registered as our trade mark and attached to all instruments sold by us, our representatives or licensees under our patents throughout the world.

TYPE S T I Application. 1st—for measuring exact depth and volume of liquids having constant specific gravity—in straight sided tanks, 2nd—for measuring exact weight of liquids of varying specific gravity in straight sided tanks, and 3rd—approximate depth or volume of liquids of varying specific gravity in horizontal cylindrical tanks.

Scales graduated in units of depth or volume corresponding to each half-inch tank depth. Types furnished in five sizes, namely—16″, 24″, 32″, 40″, and 48″, for tanks not exceeding 50 ft. in depth (based on a tank of fresh water of 1,000 specific gravity).

TYPE S T I Electrical Gauge—is similar to the standard S T I type except that it is fitted with an annunciator which warns the engineer when a predetermined level is reached.

TYPE U Fixed—is practically the same as type S T I except that being inclined at 30° it gives closer readings. Graduated to read in units of depth, weight or volume with a mark for each one-quarter inch of tank depth. Made in four sizes—for tanks not exceeding 10, 15, 20 and 30 ft. in depth and diameter.

TYPE C T I—has applications similar to the Type ST I but is designed to serve where extreme refinement is not required.

Made in three sizes for tanks 10, 20, or 30 ft. in depth and diameter.

TYPE U Adjustable—for liquids of varying specific gravity. Will accurately indicate contents in units of depth and volume and average specific gravity or Baumé when liquid head or gallons is known. When no factors are known, a special finder used with two balance chambers determines any desired factor. Applicable to all tanks—10, 15, 20, 30 ft. in diameter and depth.

TYPE C U Adjustable—is practically the same as type U described above, except that a simple shut-off valve replaces the three-way cock—the air pump is enclosed in the case, and the balance chamber is smaller. The standard balance chamber is recommended for work on viscous fluids or long lines.

GENERAL:

All Pneumercator Gauges may be manifolded to a number of tanks of the same size—but we do not recommend manifolding to more than 6 tanks Contents of each tank must be read individually.

Digitized by Google

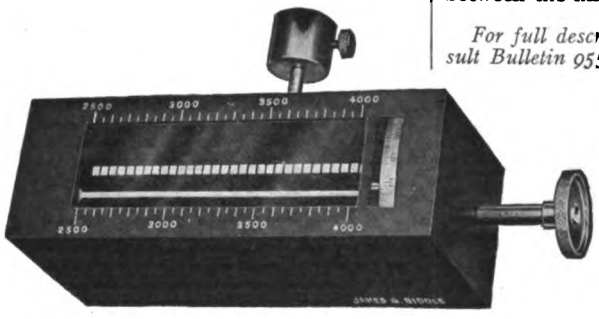
JAMES G. BIDDLE

1211–1213 ARCH ST., PHILADELPHIA

Industrial and Scientific Instruments

THE JAGABI VIBROMETER:

(Write for Descriptive Circular 915.)



A new instrument for determining vibration of:

(A) A machine under various conditions of adjustment—as of balance.

(B) A machine under various conditions of operation.

(C) A machine under ordinary conditions of "wear and tear."

(D) Two or more machines.

(E) Surrounding structures and buildings.

FRAHM VIBRATING-REED TACHOMETERS:

Frahm Tachometers are best suited for indicating speeds between 900 and 8000 R. P. M. For service outside these limits, a special actuating device must be used. After being thoroughly tried



out under long-continued service conditions, these unique tachometers are being used by all builders of steam turbines. In many cases they are included as part of standard equipment—and in others are specified by purchasing engineers. Their field of greatest usefulness includes steam turbines, centrifugal pumps, centrifuges, turbo-blowers, dynamos, motors and all other machines that run at speeds between the limits above specified.

For full description and Price List consult Bulletin 955.

Simplicity of Mounting: No belt, gears, couplings or electrical connections are required—as it is only necessary to screw the Tachometer to a convenient part of the machine under test.

JAGABI HAND TACHOMETER TYPE C:



This instrument is direct-reading in revolutions-per-minute, and is independent of the direction of rotation.

The Tachometer, without accessories, weighs a trifle more than one pound, and is exceedingly convenient to use. It has a three-inch dial.

There is *only one spindle*, but each instrument combines three ranges—the change from one to another being effected by a gear-shifting device, controlled by a special slider.

We aim to carry the following in stock:

	R.P.M.
No. 226 Range	60– 240, 100– 400, 600– 2400
No. 231 Range	100– 400, 300–1200, 1000– 4000
No. 236 Range	150– 600, 500–2000, 1500– 6000
No. 241 Range	300–1200, 1000–4000, 3000–12000

Prices upon request. Ask also for Circular 395.

OTHER BIDDLE SPECIALTIES:

Megger Testing Sets and Bridge Meggers; Evershed Low Range Ducters; Laboratory and Portable Voltmeters, Ammeters, Wattmeters, Shunts, Multipliers and Transformers; Frahm Vibrating-Reed Frequency Meters; Laboratory Rheostats; Etc.

Digitized by Google

THE ELECTRIC TACHOMETER CORP'N

PHILADELPHIA, PA.

71-73 West Broadway, NEW YORK CITY

Manufacturers of TETCO Indicating and Recording Tachometers
Portable, Stationary and Marine Types

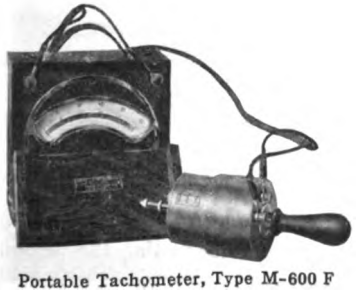
Compared with tachometers operating on a mechanical principle, *electric* tachometers and especially **TETCO TACHOMETERS,** being of the Direct Current type, have the advantage of greater accuracy and long distance control. The Transmitter, a D. C. generator with permanent field, is geared or direct connected to the shaft, whose speed it is desired to record, or to any other shaft revolving at a proportionate speed; the indicator or recording instrument may be located at any distance away from the source of energy.



Combination Indicating and Recording Tachometer, Type M-200 AS. E

The indicator or recorder movements are of the voltmeter type with scales calibrated in R. P. M. or proportional function, such as Miles per Hour, Production Units per Unit Time, or Time per Unit of Production.

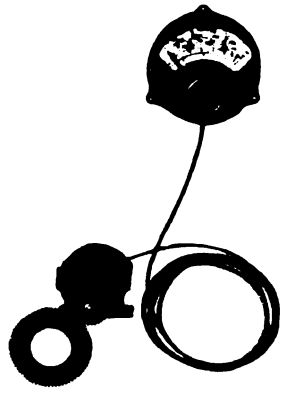
The potential generated (*i. e.*, the voltmeter reading) is *directly* proportional to the R. P. M. of the generator. Mechanical tachometers depend on different laws, generally centrifugal force.



Portable Tachometer, Type M-600 F

Transmitter and indicator are connected through a double conductor cable. Several instruments of the same type can be operated from one transmitter, or if desired, indicators and recorders, located at various distances from the source of energy. All recorders and indicators are guaranteed to be accurate within plus or minus 1%.

A great variety in indicators can be furnished, to suit different conditions. Two different types of portable tachometers (one of which is a hand type weighing 3¼ lbs.) are manufactured.



M-200 I Stoker Tachometer with Adjustable Draft Scale

The Electric Tachometer Corporation specializes in Marine and Naval Tachometers (approximately 250 U. S. Navy vessels have been fully equipped), tachometers for paper mills showing production of paper, tachometers for mechanical stokers of the Underfeed type, railroad tachometers and precision instruments for laboratory and general test purposes.

Send us data as to maximum speed, drive shaft diameter and distance required between drive point and indicator or recorder.

Literature sent upon application.

Digitized by Google

GRIEBEL INSTRUMENT COMPANY

SUCCESSORS

CARBONDALE INSTRUMENT CO.

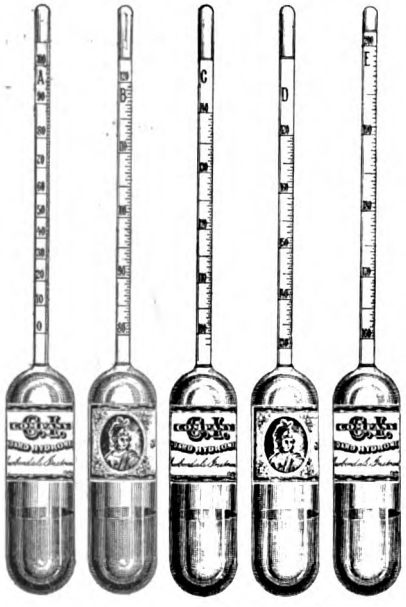
CARBONDALE, PA.

Manufacturers of Thermometers, Hydrometers, Glass Apparatus, Chemical Glassware and Laboratory Supplies

PRODUCTS:

Themometers for Laboratory, Factory, Ice Machines, Acid Plants, etc.

Hydrometers for light and heavy liquids.



SPECIALTY:

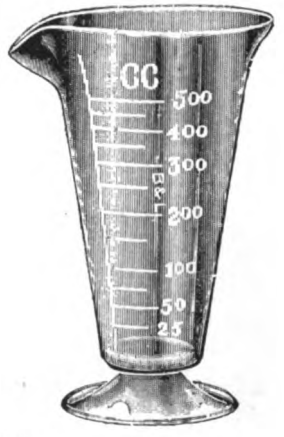
Beckmann Thermometers.

Immersion Calorimeter and all kinds of Normal Thermometers.



Send for Catalog.

Precision Volumetric Glassware graduated according to the specifications of the U. S. Bureau of Standards.



Burettes
Pipettes
Mohr's Pipettes
Cylinders, etc.
Chemical Glassware
Chemical Porcelain
Chemicals
Laboratory Supplies
Biological Apparatus
Retorts
Separatory Funnels
Gas Analysis Apparatus
Graduated Glassware
Oil Testing Instruments
Laboratory Hardware
Asphalt Testing Apparatus
Cement Testing Apparatus
Sugar Testing Apparatus
Water Testing Apparatus
Instruments for testing the percentage of Alcohol.

Digitized by Google

Power Transmission Machinery

EQUIPMENT CATALOGUED IN THIS DIVISION

Data begins on page number given, as closely as can be divided. Consult Directory Section (green pages) for specific products.

Balls, Steel Bearing	350
Bearings	328
Bearings, Ball and Roller	340
Belt Lacers	364
Belting	360
Boxes, Hanger	328
Bushings	336
Chains, Power Transmission	320
Clutches	303
Controls, Flexible Wire	358
Couplings	312
Gears	303
Gears, Speed Reduction	304
Hangers, Shaft	324
Pillow Blocks	328
Power Transmission Machinery	304
Pulleys	319
Rope Drives	335
Shafting	334
Shafts, Flexible	359
Sheaves	323
Speed Reducers (Gear)	304
Transmissions	304

See next page for list of firms catalogued

CATALOGUE SECTION

PART III **Pages 301-364**

Digitized by Google

INDEX TO FIRMS CATALOGUED IN PART III

A

PAGE

American Pulley Co. 322
Auburn Ball Bearing Co. 340

B

Bearings Co. of America 341
Bound Brook Oil-Less Bearing Co. 336
Brown, A. & F. Co. 303
Bunting Brass & Bronze Co. 337

C

Caldwell, W. E. Co. (Inc.) 323
Chicago Pulley & Shafting Co. 324, 325
Cleveland Worm & Gear Co. 306

D

Detroit Oak Belting Co. 360
Diamond Chain & Mfg. Co. 320
Dodge Sales & Engineering Co. 326, 327, 328, 329

F

Falk Co. 304, 305
Falls Clutch & Machinery Co. 330
Fawcus Machine Co. 307
Flexible Steel Lacing Co. 364
Foote Bros. Gear & Machine Co. 308, 309

G

Gwilliam Co. 356, 357, 358

H

Hill Clutch Co. 331
Hyatt Roller Bearing Co. 342, 343

J

James, D. O. Mfg. Co. 310, 311
Johnson Bronze Co. 338
Johnson, Carlyle Machine Co. 332
Jones, W. A. Foundry & Machine Co. 312, 313, 314, 315

M

Meachem Gear Corp'n 318
Medart Patent Pulley Co. 333
Metaline Co. 339
Morse Chain Co. 321

N

New Departure Mfg. Co. 344, 345
Norma Co. of America 351

P

Poole Engineering & Machine Co. 316, 317

R

Reeves Pulley Co. 319
Rossendale-Reddaway Belting & Hose Co. 361
Royersford Foundry & Machine Co. 346, 347

S

S. K. F. Industries (Inc.) 348, 349, 350
Schieren, Chas. A. Co. 362, 363
Standard Steel & Bearings (Inc.) 354

T

Timken Roller Bearing Co. 352, 353

U

U. S. Ball Bearing Mfg. Co. 355

W

White, S. S. Dental Mfg. Co. 359
Wood's, T. B. Sons Co. 334, 335

Digitized by Google

THE A. & F. BROWN CO.

Established 1854 — Incorporated 1898

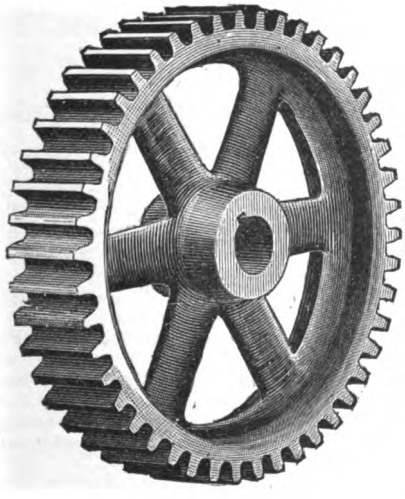
79 BARCLAY STREET,
NEW YORK CITY

WORKS:
ELIZABETHPORT, N. J.

Engineers, Founders, Machinists and Millwrights. Manufacturers of Gears of all Descriptions, Turned Steel Shafting, Pulleys, Split Pulleys, Friction Clutches, Special Machinery, Etc.

CUT GEARS:

These gears are cut on the best up-to-date automatic machines obtainable, enabling this department of the shops to turn out accurately cut gears of every description and size.

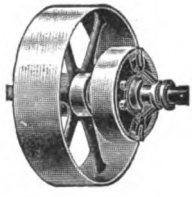


MACHINE MOULDED GEARS:

The Gear Department of our foundry is fitted up with the most modern gear moulding machines, enabling us to furnish machine moulded gears up to 16 feet diameter, and 25 tons in weight if in one piece, and heavier if split, or built up. These gears are much more accurate than ordinary cast gears and are of the toughest mixture of iron.

FRICTION CLUTCHES:

The F. Brown Friction Clutch is simple, compact and having few small parts is not liable to get out of order; engages gradually and when thrown "in gear" has a stronger grip than any other, owing to the large friction surfaces and powerful operating device which is a combination of double-ended (or right and left thread) screw and toggle joint.



303

SIRENS:

These fog signals are used by the United States Navy and Lighthouse Departments, also by a number of foreign governments and many steamships. They are also in use as fire alarm signals in small towns and large manufacturing plants.

COGSWELL MILL:

The problem of grinding or pulverizing many materials has been successfully solved by this machine.

SPECIAL MACHINERY:

These shops are particularly well equipped for building special machinery to plans and specifications. The pattern shop, foundry and machine shops are strictly up-to-date in all particulars and equally well equipped to turn out work of the heaviest character as well as light machinery requiring first class material and workmanship and most modern tools.

SEE OUR ADVTS IN MECHANICAL ENGINEERING THE JOURNAL OF THE A.S.M.E.

Digitized by Google

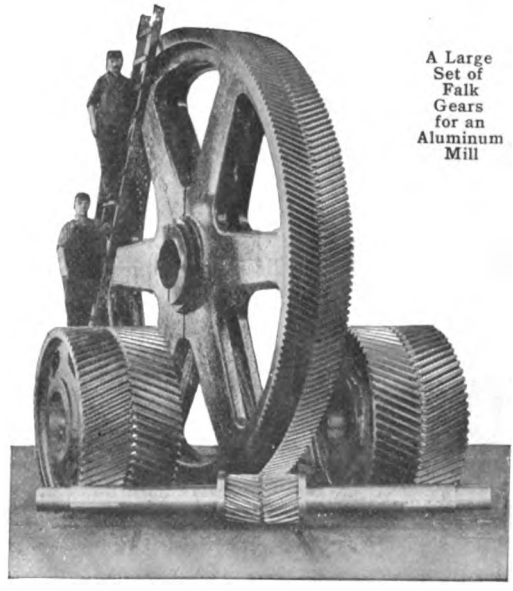
THE FALK CORPORATION

Successor to

THE FALK COMPANY

MILWAUKEE, WISCONSIN

Manufacturers of Precision Herringbone Gears with Staggered Teeth (Wuest Patents)



A Large Set of Falk Gears for an Aluminum Mill

Fig. 1

FALK HERRINGBONE GEARS:

We manufacture a complete interchangeable system of herringbone gears, with teeth generated on special machines, designed and built exclusively for our own use.

The gears which we produce are hobbed, both sides at once, in solid blanks.

The Wuest System of staggered teeth, besides giving the maximum contact surface for a given width of face, is invaluable in securing unbroken continuity of engagement when using high ratio pinions with very few teeth.

Other distinctive features:

Highest attainable accuracy.

Involute tooth form on *circumferential* section.

Invariable spiral angle.

Perfect interchangeability.

Equal efficiency in both directions.

SPECIAL ADVANTAGES:

Long life.

High efficiency (loss never exceeds 1% at rated load).

Elimination of counter-shafts and double-gear trains.

Absence of vibration with prevention of shaft crystallization and breakdown of motor insulation.

Quiet action with durable steel pinions.

SIZES:

We manufacture hobbed herringbone gears in the following sizes:

Any pitch, from 10 D. P. to ¾ D. P.

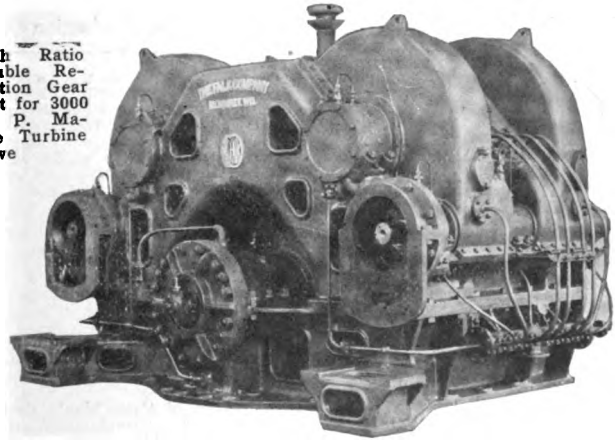
Any face from 1¼ inches to 72 inches.

Any diameter from 2 inches to 16 feet.

True spiral gears of constant angle cut to standard diametral pitch like spur gears.

Referring to illustrations, **Fig. 1** shows a large set of Falk gears for an aluminum mill. **Fig. 2** shows a high ratio double reduction gear unit for 3000 H. P. marine turbine drive—U. S. Shipping Board. **Fig. 3** is a standard type of herringbone gear unit for motor-driven rolling mills.

Digitized by Google



High Ratio Double Reduction Gear Unit for 3000 H. P. Marine Turbine Drive

Fig. 2

FALK HERRINGBONE GEARS:

FALK HERRINGBONE GEARS transmit power by smooth, continuous action without jar, shock or vibration.

They are almost noiseless.

They can be used for extremely high *single* gear ratios. In this connection we make a specialty of forged pinions in one piece with their shafts. Ratios of 15 to 1 are quite normal and 20 to 1 may be used when necessary. Wuest gears can be run with safety at far higher velocities than the spur type. Special gears for use in connection with steam turbines are suitable for speeds up to 10,000 feet per minute.

Specially adapted for:

Marine Steam Turbines.
Oil Engines.
Turbo-Generators.
Turbine-Driven Centrifugal Pumps, Mills and Shafting.
Rolling Mills, Rod Mills and Sheet Mills.
Tube Mills and Crushing Plant.
Power Pumps.
Air Compressors and Blowers.
Hoisting, Elevating and Conveying Plant.
Rubber Machinery.
Machine Tools.

The range of application for Falk herringbone gears covers every case where spur gears are used and many new fields where spur gears are impossible.

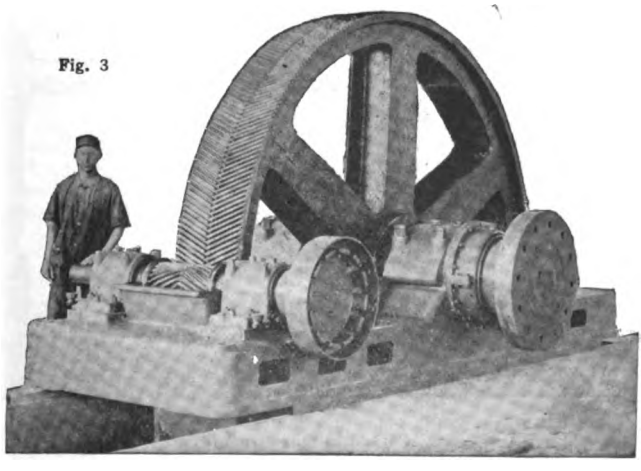


Fig. 3

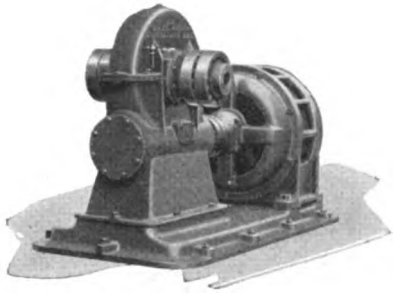
Standard Type of Herringbone Gear Unit for Motor-Driven Rolling Mills

Digitized by Google

THE CLEVELAND WORM & GEAR CO.

CLEVELAND, OHIO

Manufacturers of Worm Gears and Worm Gear Reduction Units



An ideal line shaft reduction

Cleveland Worm Gear Reduction Units:

The Cleveland Worm & Gear Company is the only concern in America devoting its entire energies to the production of fine worm gearing. It makes worm gears for use in motor trucks and tractors, and also Cleveland Worm Gear Reduction Units.

Cleveland worm gears are of the straight type. The "straight" type worm maintains a constant pitch diameter over its entire length, and the straight faced tooth offers no basic difficulty to accurate grinding of the flanks of the worm teeth to remove distortion after hardening. This means uniform accuracy of production—uniform dependability.

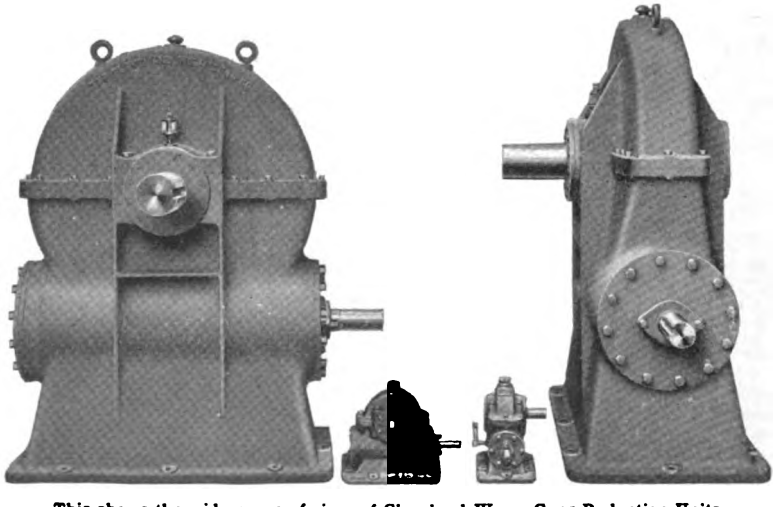
Back of Cleveland worm gearing is an experience of more than twenty-five years manufacturing worm gears exclusively.

The use of Cleveland Worm Gear Reduction Units is rapidly increasing as engineers familiarize themselves with the virtues of good worm gearing. We emphasize the *good* because, just as there is nothing better than a *good* worm gear, it is conversely true that there is nothing poorer than a poor worm gear. Our engineering department is always ready to extend full cooperation in suggesting and laying out suitable plans for correct installations.

The worm gearing used in our speed reduction units is precisely the same type of high efficiency worm gearing used in finely built motor trucks like the Packard, Pierce Arrow, and others. The advantages of Cleveland Worm Gear Reduction Units briefly summarized are: High efficiency, compactness, ability to employ right angle drive, silence in operation, uniform torque, perfect lubrication and exceptionally low maintenance cost.

Because of these highly developed qualities, the use of the Cleveland Worm Gear Reduction Units is rapidly extending in almost every line of industry. These units are already in use in connection with mechanical stokers, turbines, hoisting and conveying devices, mining machinery, rubber mills and calenders, textile machinery, electric smelting furnaces, refrigerating machinery, chocolate mills, agitators, paper machines, rolling mills, elevators, open hearth furnaces, macaroni machinery, asbestos machinery, cement mill machinery, car pulls, line shafts, machine tool drives, pulpers, filters, etc.

It is evident that with such marked ability to handle unusual gear ratios and with units suitable for use with motors of from 1 to 400 h. p. there is a wide field of usefulness for this product. Through the versatility of these units the use of light industrial motors is made possible with assurance of practical economy and satisfactory service. Built especially for each job, Cleveland Worm Gear Reduction Units are shipped complete ready for installation. Correspondence is invited.



This shows the wide range of sizes of Cleveland Worm Gear Reduction Units. Capacities range from less than 1 to 400 H. P.

Digitized by Google

FAWCUS MACHINE COMPANY

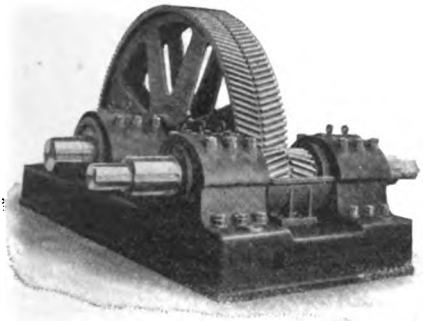
PITTSBURGH, PA.

OFFICE
2818 Smallman Street

WORKS
Pittsburgh and Ford City, Pa.

Cut Gears and Special Machinery

FAWCUS HERRINGBONE GEARS:



Fawcus Rolling Mill Drive

The purpose of Fawcus herringbone gears is to transmit power more quietly and more efficiently than is possible with spur gears. Gear and pinion teeth are cut in solid blanks on Fawcus patented hobbing and planing machines.

Opposite halves of each tooth are machined simultaneously, thereby obtaining maximum accuracy of tooth form, spacing and alignment. (Fawcus Patents.)

Correct construction demands that the two halves of each tooth be set opposite, the apex of the angle being in the center of the gear face. Face width must be so proportioned that teeth will have overlapping or continuous action, the minimum face width being about six times the circular pitch of the teeth for a standard helix angle of 23°. All teeth are cut to diametral pitch standards, twenty degrees involute short addendum.

The accuracy of Fawcus gears makes possible their use for high peripheral velocities and large ratios of speed reduction. They may be advantageously used wherever a positive means of transmitting power is required.

The Fawcus Machine Company will gladly lend the best assistance of its engineering department in recommending and quoting on gearing for all purposes.

Valuable engineering data and additional descriptive information on Fawcus herringbone gears will be mailed to engineers and other interested persons on request.

PRODUCTS:

Cut Herringbone Gears
2 inches to 20 feet diameter.

Cut Spur Gears
2 inches to 20 feet diameter.

Cut Bevel Gears
2 inches to 48 inches diameter.

Cut Worm Gears
2 inches to 10 feet diameter.

Enclosed Worm Gears
5 H. P. to 25 H. P.

Flexible Couplings
For shafts 1″ to 20″ diameter.

Special Machinery
"Built to your order."

Standard Enclosed Herringbone Gear Drives
25 H. P. to 1500 H. P. (Herringbone Gear Booklet on request).

Special Enclosed Gear Drives
25 H. P. to 15,000 H. P.

Turbine Reduction Gears
25 H. P. to 12,000 H. P.

OUR SPECIALTY:

Is making cut gears to your order. Give us your problem or send specifications. We design complete transmissions. Our shop facilities are such that we can handle orders rapidly. We invite inquiries on any kind or size of gear. The services of our engineers are at your disposal if needed.

SEE OUR ADVT. IN MECHANICAL ENGINEERING THE JOURNAL OF THE A.S.M.E.



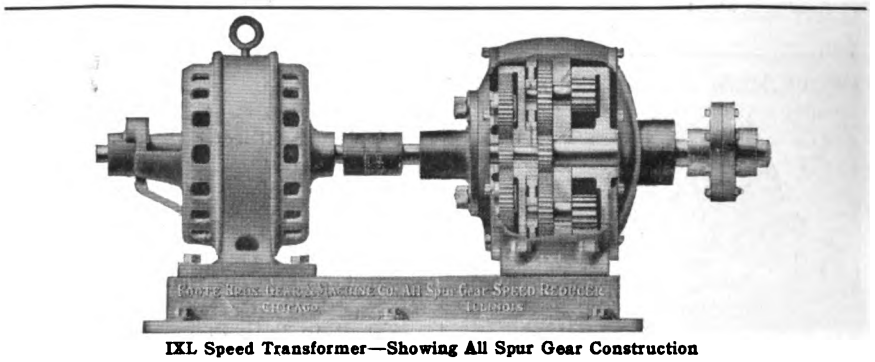
FAWCUS CORRECTLY CUT GEARING FOR EVERY SIZE OR STYLE OF CUT GEAR

Digitized by Google

FOOTE BROS. GEAR & MACHINE CO.

213-223 N. CURTIS ST., CHICAGO, ILL.

Manufacturers of Speed Transformers, Tractor Transmissions, Cut Gears of All Kinds



IXL Speed Transformer—Showing All Spur Gear Construction

FOOTE SPEED TRANSFORMERS:

For Reducing or Increasing Speeds, Any Ratio.

Compact, entirely enclosed, oil tight, dust proof, perfect lubrication—saves power, prevents troubles caused by dust and dirt, prevents accidents—for cement mills, mines, etc.

Foote IXL Speed Transformers:

308

CASE—Cast iron, dust proof, oil tight, removable covers.

BEARINGS—Phosphor bronze, bushed throughout; designed for heavy duty and long life.

PINIONS—Alloy steel, heat treated and hardened, giving great tensile strength. IXL Universal Coupling can be furnished to compensate any reasonable error in alignment of motor and transformer shafts.

DESIGN—The IXL Transformer is constructed along lines of a motor. Cast iron base furnished according to your blue prints at additional cost.

QUALITY—Designed and built to give perfect satisfaction.

PRICES—On application. Send for full information.

Foote IXL Worm Gear Speed Transformer:

CASE—Cast iron, sand blasted inside, and coated with oil-proof preparation, oil tight and dust proof.

WORM—Made of steel.

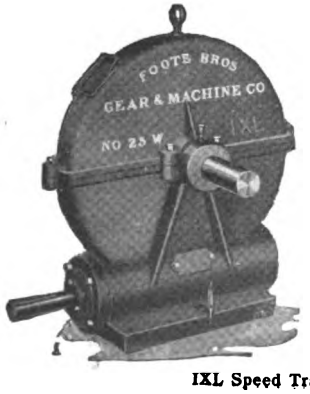
WORM GEAR—Made of bronze or semi-steel.

OIL SPACE—Ample system for properly oiling high speed worm shaft.

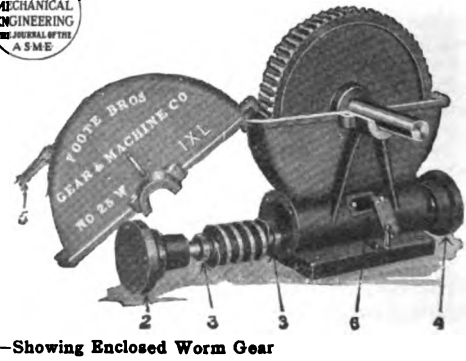
WORM SHAFT—Properly babbitted so worm and gear run freely.

BEARINGS—Large, providing for long life. Hyatt Roller Radial Bearings furnished at extra cost.

LOOK-IN-DOORS—Foote IXL Speed Transformers are the recognized standard for reducing or increasing speeds of machinery without the use of line shafting and belts. These transformers are made in all sizes, types and speeds for all purposes. Get the advice of our Engineering Department.



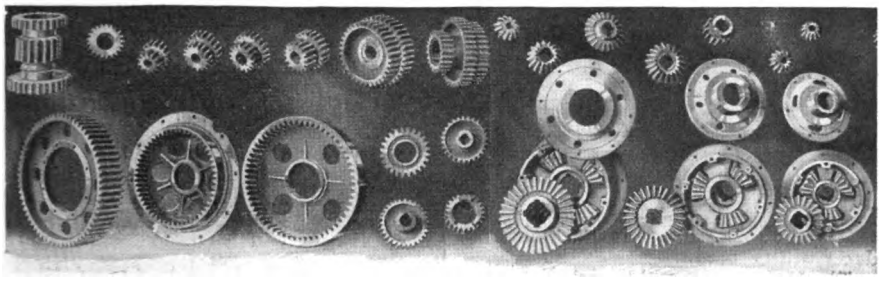
SEE OUR ADVT. IN MECHANICAL ENGINEERING THE JOURNAL OF THE ASME



IXL Speed Transformer—Showing Enclosed Worm Gear

Digitized by Google

FOOTE BROS. GEAR & MACHINE CO. CHICAGO, ILL.



FOOTE CUT GEARS—All Kinds for All Purposes:

Cut Spur Gears, Internal Gears, Racks, Worm Gears, Worms, Spiral Gears, Herringbone Gears, Bevel and Miter Gears.

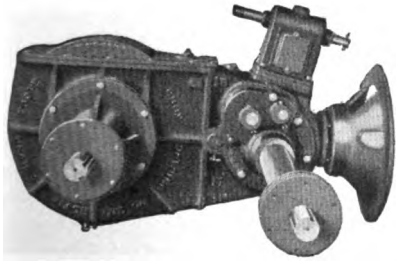
Our Rawhide Pinions and Bakelite Micarta Pinions are made from the best stock obtainable.

Hardened Gears made by our special process will stand the severe duty required on Farm Tractor Transmissions and heavy duty machinery.

Foote Dependable Tractor Gears are known the world over. These Gears are made to withstand the rigorous duty of tractor work with a good factor of safety. Foote Gears, Steering Gears and Differentials are built in all sizes and materials for all types of tractors. Prompt deliveries.

Send for general catalog on Gears, etc.

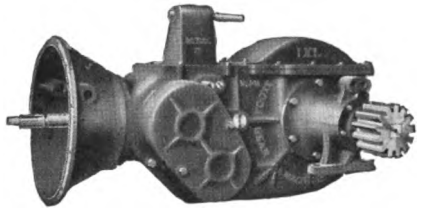
FOOTE FARM TRACTOR TRANSMISSIONS:



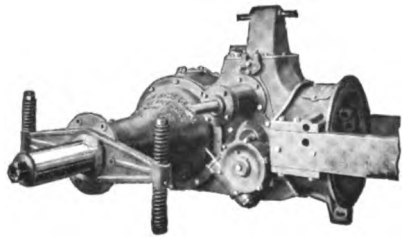
Model "B" Transmission is a heavy type for 3 plow tractors, 2 speeds, forward and reverse, bull pinion drive, specially heat-treated gears, Hyatt Roller Bearings, alloy steel shafts. Giving dependable service to thousands of tractors.

Model "C" Transmission, same design as Model "B," but made for 4 to 6 plow tractors, and for either 2 or 3 speeds.

FOOTE FARM TRACTOR TRANSMISSIONS (Continued):



Model "D" Transmission is a 3 to 4 plow, heavy duty transmission with 2 speeds and reverse, and a pair of change gears outside of case, which can be reversed in position, giving two lower speeds if desired. Equipped with Hyatt Bearings, alloy steel shafts. Enclosed working parts reduce maintenance and prolong the life of the tractor.



Model "D-U" Transmission, 3 to 4 plow live axle drive, planetary final drive, enclosed quick change gears outside of main housing. All working parts enclosed and run in a bath of oil. For 30 to 40 H. P. motors, can be supplied with driving spiders, cushion springs, drawbar, steering gear, engine and front axle supporting frame.

Model "F-U" Transmission same as "D-U" Transmission, except built for 30 H. P. motors.

CONSULT FOOTE ENGINEERING SERVICE:

Foote Engineering Service has solved engineering problems for many manufacturers. This service is yours to consult freely and without obligation.

Digitized by Google

D. O. JAMES MANUFACTURING CO.

1114–1124 W. Monroe St., CHICAGO, ILLINOIS

Manufacturers of Bevel, Mitre, Spur, Spiral, Bakelite and Worm Gears; Worm Gear Reductions; Speed Reduction Transmissions

This Company's engineers will satisfactorily solve all speed reducing problems. They will recommend the correct drive for any purpose and furnish estimates upon receipt of the following information.

(1) State class of work for which reducer will be used.
(2) Horsepower and speed of motor.
(3) Speed of driven shaft required.
(4) Whether for continuous or intermittent duty.
(5) Whether loads are uniform or subject to shock.

SIZES AND RATIOS OF JAMES SPEED REDUCERS:

James speed reducers can be furnished for any reduction of speed from the ratio of 4 : 1 to 1600 : 1, in sizes from 1 H.P. to 100 H.P.

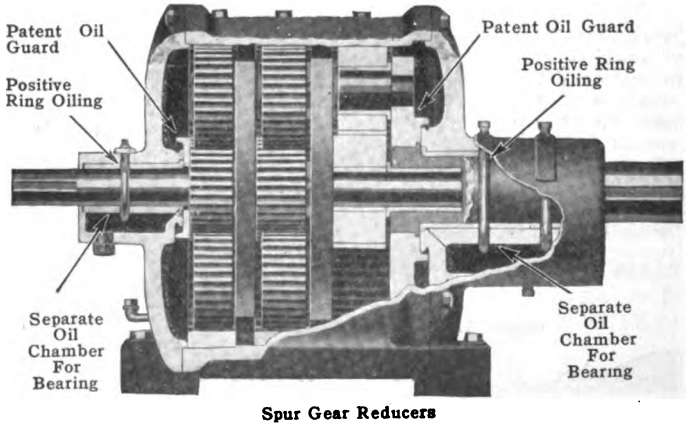
SPUR GEAR SPEED REDUCING TRANSMISSIONS:

of dirt getting in the working parts (increasing its life and lessening noise) and leaves no gears exposed to injure workmen.

Compact Construction—The James reducer is a unit in itself, compactly constructed, having much the appearance of an electric motor. It occupies very little space, usually less than that occupied by the motor. It is easily installed, can be placed on the same base as the motor or arranged for ceiling suspension. It will be found highly efficient, strong and durable, the gears being entirely enclosed in housing operating in a bath of oil under ideal conditions.

Wide Range of Adaptability—James reducers admirably adapted for use in countless industries where more or less

310



Spur Gear Reducers

These centrally driven well balanced drives of great emergency strength are designed to eliminate the objectionable features in evidence in other forms of power transmission and were developed to meet the requirements of a variety of applications.

The James reducer meets the demand for a reliable and efficient method of reducing motor speeds. Being fully enclosed, it positively eliminates all chances

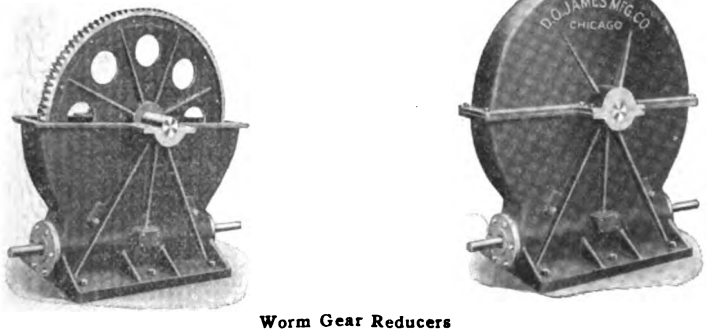
dirt and grit are constantly getting in the exposed gearing of some other types of reducers, causing excessive wear and requiring but a few months in many instances for their complete destruction.

James reducers find most satisfactory application in operating stokers, ore roasters, cereal cookers, elevating and conveying machinery, car pullers, car loaders, hoists, elevators, stuff chests, agitators, mixers, paint chasers, driers, etc.

Digitized by Google

D. O. JAMES MFG. COMPANY — CHICAGO, ILL.

WORM GEAR SPEED REDUCING TRANSMISSIONS:



Worm Gear Reducers

Incased worm gear reductions unusually satisfactory where a great reduction is required with a light load and have the same high quality, dependability and durability as the spur gear type, the latter however, being adapted for conditions requiring heavy duty and continuous service.

Worm may be run in either direction and abundant lubrication of worm and worm shaft has been provided.

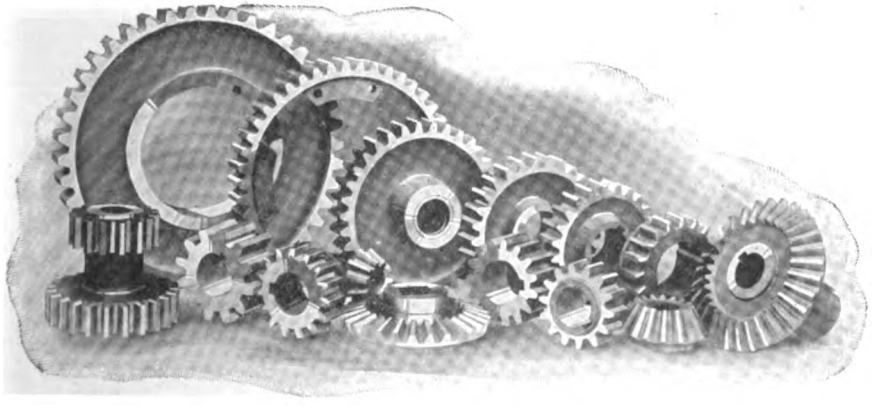
When properly installed and not overloaded, they will give the utmost satisfaction. Each reducer is thoroughly tested before leaving the factory.

CUT GEARS:

This company has been a producer of high grade cut gears since 1888. Its plant is fully equipped with modern machinery for the accurate production of large or small cut gears of every description in any quantity, the unexcelled facilities of the company insuring prompt shipments and guaranteed satisfaction.

311

SEE OUR ADVTS IN MECHANICAL ENGINEERING THE JOURNAL OF THE A.S.M.E.



Gears

Digitized by Google

W. A. JONES FOUNDRY & MACHINE CO.

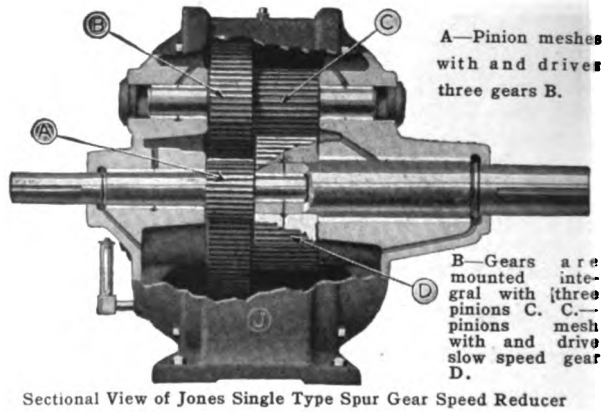
CHICAGO, ILL.
4415 W. ROOSEVELT ROAD

NEW YORK CITY
20 MURRAY ST.

Manufacturers of Cast Iron Pulleys, Friction Clutches, Cut and Cast Gears, Spur and Worm Gear Speed Reducers, Rope Drives, Sprocket Wheels, and General Power Transmission Machinery

JONES SPUR GEAR SPEED REDUCERS:

Are designed for use between electric motors and driven units, and are adapted to practically all classes of mill, factory and plant drives where a speed reduction is required. In appearance they somewhat resemble the electric motors, and are about the same size as motors of the same horsepower.



Sectional View of Jones Single Type Spur Gear Speed Reducer

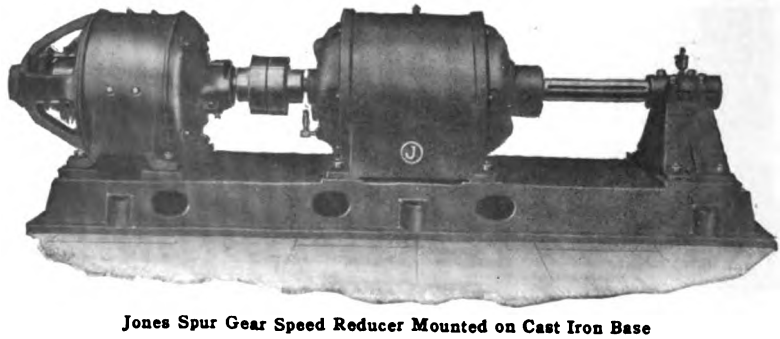
All shafts and gears in the Jones Reducer are made from special analysis steel. All gears are involute stub tooth, 20° pressure angle, accurately generated. The entire mechanism is enclosed in an oil-tight, dust-proof, cast-iron housing, thus insuring perfect lubrication, long life, and freedom from the injurious effect of abrasive dust.

Jones Reducers have proved a very satisfactory and economical means of accomplishing speed reduction. Once installed, no attention is required, aside from an occasional supply of oil, which is distributed throughout the moving parts by splash.

Jones Reducers economize space and reduce installation costs, comply with all safety laws, and may be used for floor or overhead mountings. They are made in sizes from 1 to 200 h. p., or over. Extremely large ratios can be obtained by combining our spur and worm gear reducers in one drive.

Our Engineering Department will gladly co-operate with you in analyzing your speed reduction problems.

SEE OUR ADVT. IN MECHANICAL ENGINEERING THE JOURNAL OF THE A.S.M.E.

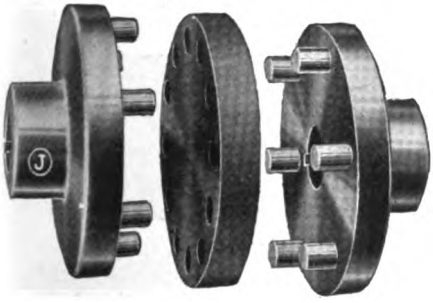


Jones Spur Gear Speed Reducer Mounted on Cast Iron Base

Digitized by Google

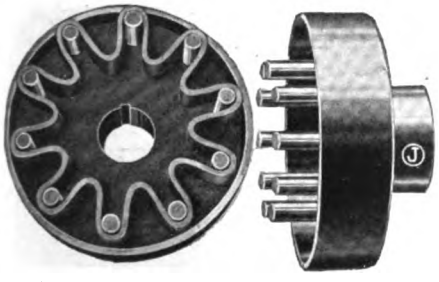
W. A. JONES FOUNDRY & MACHINE CO. CHICAGO, ILL.

JONES STYLE "A" FLEXIBLE COUPLINGS:



These couplings will take care of a reasonable amount of misalignment in the connected shafts. Steel pins are evenly spaced near the outer edges of two cast iron flanges, between which is a fiber disc, with a number of holes corresponding to and slightly larger than the steel pins, thus permitting a certain amount of float when assembled. They are accurately finished all over.

JONES STYLE "B" FLEXIBLE COUPLINGS:



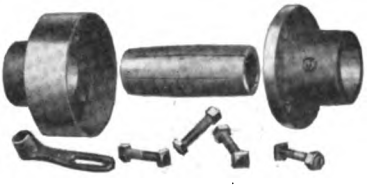
The most flexible coupling made. Steel pins are connected by an endless, flexible, oil-treated leather belt, which takes care of extreme misalignment, and relieves driving or driven units of much of the shocks caused by pulsation. It is particularly well adapted for motor driven fans, heavy duty engines, generator sets, etc.

JONES FLANGE COUPLINGS:



These couplings are of very rugged construction. They are finished all over, insuring a true periphery and perfect balance. This prevents vibration, even at high speeds, and thereby greatly diminishes wear and depreciation. The bolt-holes are accurately drilled, and tight-fitting, turned bolts are used, insuring an absolutely rigid connection.

JONES KEYLESS COMPRESSION COUPLINGS:



These couplings can be installed in a fraction of the time usually spent. There are no keys to fit, and no time is lost in centering shafts, which are kept in perfect alignment by the one-piece sleeve. When assembling, it is merely necessary to tighten the bolts gradually, and the sleeve grips the shafts so firmly that they cannot slip, even under the heaviest loads.

(Continued on next pages)

Digitized by Google

(Continued from preceding pages)

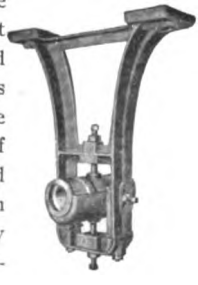
W. A. JONES FOUNDRY & MACHINE CO. CHICAGO, ILL.

JONES PLAIN RIGID PILLOW BLOCKS:



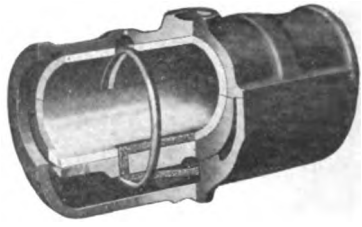
In designing our plain rigid pillow blocks we have deviated considerably from the usual type of plain oiling bearings. Not only is the base finished, but the joint between the base and cap is accurately machined. The bearings are babbitted and accurately bored to size. In order to provide ample bearing surface for taking thrust from set collars, the ends of the bearings are of large diameter and faced square with the bore. The oil holes are tapped to permit the use of grease cups, if desired. Quantity production and modern manufacturing methods enable us to meet the prices commonly quoted on ordinary pillow blocks.

JONES UNIVERSAL DROP HANGERS:



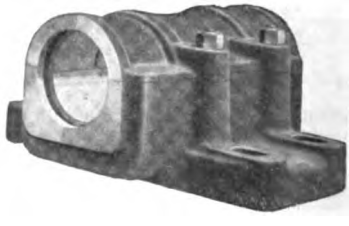
These hangers are so designed that a wide range of adjustment in both lateral and vertical directions is secured within the frame. Places of strain are reinforced by wide ribs and arch bracing, particularly where metal is eliminated to reduce weight. Thorough lubrication is provided by the Duplex oiling bearing. These hangers have met with the enthusiastic approval of millwrights and engineers whenever they have compared them with ordinary hangers.

JONES DUPLEX OILING HANGER BOXES:



The above cut shows a sectional view of our Duplex Oiling Hanger Box. It is babbitted, accurately bored and reamed, and faced at both ends. It has an extra large oil reservoir, and the combination of capillary and ring oiling principles make continuous oiling a certainty. The two revolving rings carry a constant supply of oil to the shaft, and even if the rings cease to turn, the wick amply lubricates the entire bearing surface. This is of wool felt, will not glaze over, and keeps the bearing absolutely clean, while wipers at both ends return oil to the reservoir. The same oiling principle is used in our Duplex oiling rigid pillow blocks.

JONES DUPLEX OILING RIGID PILLOW BLOCKS:

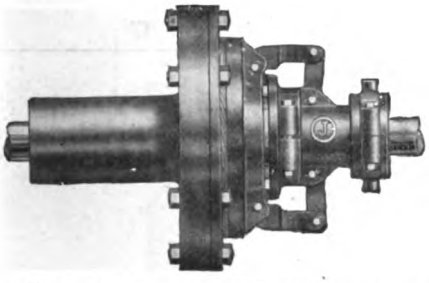


These pillow blocks have the same oiling device as our Duplex oiling hanger boxes. They are lined with a high-grade babbitt and accurately bored to size. They are finished on the bases and on the ends of the bearings.

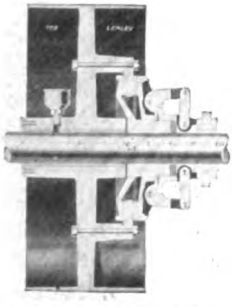
Digitized by Google

W. A. JONES FOUNDRY & MACHINE CO. CHICAGO, ILL.

LEMLEY FRICTION CLUTCHES:



These clutches are made solid or split, and can be furnished as cut-off couplings or with sleeves on which pulleys, gears, sprocket-wheels or sheaves can be mounted, or they can be attached by means of bolts through the arms of the driving members. Lemley gasoline engine friction clutch pulleys can either be mounted on the engine shaft or bolted to the arms of the engine flywheel. The friction surfaces are wood, fiber, or burnproof surfaces in double contact with iron. Toggle adjustment is made by means of a split, threaded ring, which adjusts all toggles at once, and assures uniform pressure.



JONES CUT AND CAST GEARS:



Jones gears are made with either machine-cut or cast teeth. They can be furnished as spurs, bevels, mitres, spirals, worms or worm gears, made of any material used for the purpose—cast iron, cast steel, forged steel, bronze, rawhide, Bakelite, etc. For ordinary slow speeds and rough work, cast tooth gears will in many cases give satisfactory service, but, except in such cases, cut tooth gears will prove much more satisfactory and economical, even though the initial cost is slightly more. On account of the accuracy of cut teeth, they can safely be used under working loads one-third greater than allowed for cast teeth.



Thousands of patterns for gears are carried; thus we can fill most orders without any pattern expense.

JONES CAST IRON PULLEYS:

Jones pulleys are made of cast iron, either solid or split, in any diameter from 1 in. to 12 ft. or more, for any width of belt, from ½ in. to 72 in. or wider, and for any shaft diameter. They are accurately bored, with the rims turned true, and are either keyseated, setscrewed, or both, and balanced. Many standard sizes, up to 24 in. in diameter, are kept in stock, finished complete and ready for shipment. All other sizes are usually made to order, and shipped promptly.



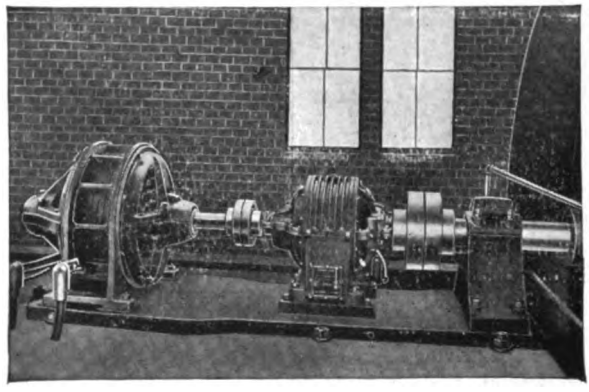
Digitized by Google

THE POOLE ENGRG. & MACHINE CO.

Established 1843

WOODBERRY, BALTIMORE, MD.

Manufacturers of Gears and Power Transmission Machinery



200 H. P. Turbo-Gear Line Shaft Drive

THE TURBO-GEAR (Fast Patents):

The Internal Herringbone Turbo-Gear is a patented, self-contained, mechanical power transmission, interposed between and directly coupled to the prime mover and the driven unit. It may be used as either a step-up or step-down speed transforming device.

Gear Members:

The Turbo-Gear consists of a large, internal, double-helical gear made of a special-analysis, open-hearth, steel forging, heat-treated to increase its ductility and to insure uniform hardness. A double-helical pinion cut integral with the high-speed shaft, made of Halcomb-electric furnace chrome-vanadium steel heat-treated to an elastic limit of 180,000 pounds per square inch and of proper hardness to minimize wear. Intermediate double-helical gears made of high-carbon steel forgings with large bronze bearings are mounted on hardened and ground, forged, steel shafts secured to the cast-steel, slow-speed member.

On this slow-speed member, which is part of the slow-speed shaft, are mounted two heavy-duty S. K. F. Ball Bearings, one on each side of the gears, and supported directly by the substantial housing. Thus it will be seen that the slow-speed member and shaft carrying the intermediate gears, and the high-speed shaft and pinion are independent of one another for support and yet each is supported directly by the housing. The internal gear is stationary, the moving members are the pinion and intermediate (planetary) gears.

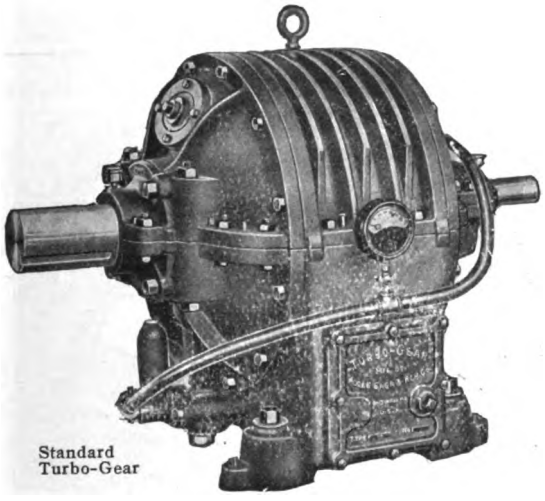
The gear members in the Turbo-Gear are cut on a gear generator, especially designed for this purpose, that produces a true involute-shape stub tooth of unequalled accuracy and finish.

Reliability:

The Turbo-Gear is built for long service. It is rugged and compact, yet of ample proportion with low tooth pressures to resist overloads and shocks as well as wear.

Digitized by Google

THE POOLE ENGRG. & MACHINE CO. BALTIMORE, MD.



Standard
Turbo-Gear

General Application:

Speed, efficiency and safety are the watchwords of the day. The Internal Herringbone Turbo-Gear meets all these requirements. It can be successfully employed for all kinds of gear drives, and used instead of the noisy, inefficient and highly dangerous methods of transmitting power, through belts, ropes and chains.

Turbo-Gears are used with:

Motor Driven: Blowers, Centrifugal Pumps, Compressors, Conveyors, Line Shafts, Rubber Mills.

Turbine Driven: Centrifugal Pumps, Condensers, Fans, Generators, Rotary Pumps, Stokers.

Oil Engine Driven: Centrifugal Pumps.

Water Wheel Driven: Centrifugal Pumps, Exciters.

There is no type of drive which would not be made less noisy, more efficient and use less power by adopting this transmission.

Advantages:

High efficiency (98–99%).

Safety (no belts, chains or sprockets, no exposed gears, no guards required).

Freedom from noise and vibration.

Small floor space required.

Totally enclosed (can be used in wet, dirty, dusty, gritty places).

Simplicity (sprockets, chains, pulleys, belts, hangers, bearings, extra shafting, etc., eliminated).

Reversibility (can be used to either step-up or step-down the speed) and can drive in either direction of rotation.

Low first cost (lower than a complete gear, chain or belt drive).

Low maintenance cost (practically nothing).

No side strain on shafts or bearings (pure torque transmission).

Low erection expenses.

No subsequent adjustments needed Once properly set up always thereafter in running condition.

Large speed-reduction makes possible the use of a higher-speed, cheaper, more efficient motor.

Wider range of speed reduction than any other single-reduction form of drive.

Cool operation—sure proof of high efficiency.

All tooth pressures are balanced.

High- and low-speed shafts in axial alignment.

Each rotating member independently and directly supported by the housing.

Gears sprayed by a continuous stream of oil under pressure.

Three times as many teeth in constant contact as on any other form of Herringbone Gear drive for equal power. Consequently, low tooth pressure with corresponding increase of life.

Lighter weight per horse power than any other complete reduction gear.

Capacity:

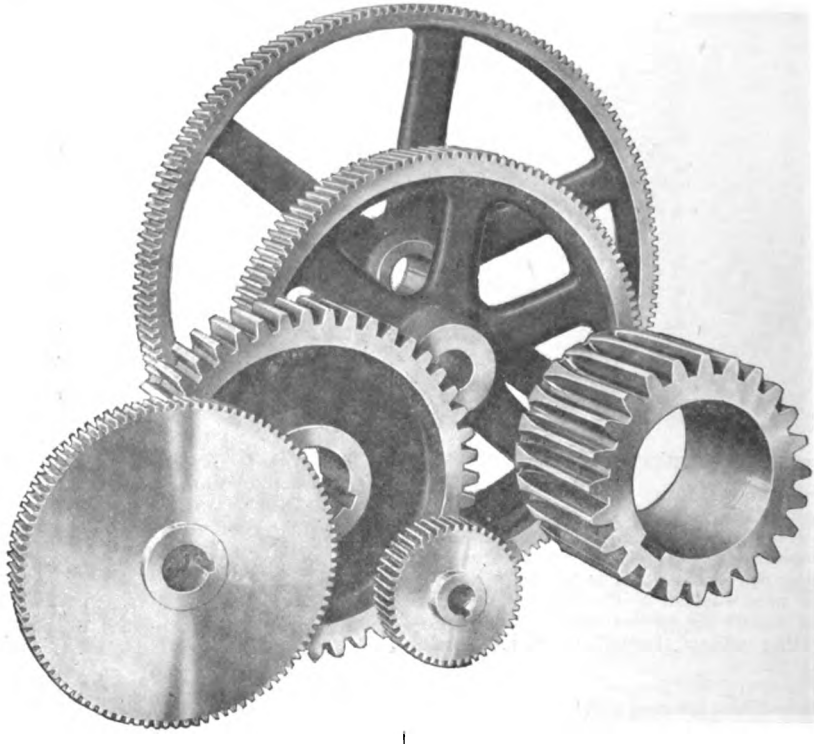
The Turbo-Gear can be furnished in any capacity from 2 horse power up.

Digitized by Google

THE MEACHEM GEAR CORPORATION

CANAL STREET AND WEST SHORE RAILROAD, SYRACUSE, N. Y.

Manufacturers of Gears and Pinions



GEAR MAKING FACILITIES:

Meachem Gear design and manufacture is based on over 33 years of experience in making gears exclusively. The Meachem pattern racks contain more than 16,000 gear patterns, covering all usual requirements and helping to reduce considerably the time and cost of filling gear orders of standard and special sizes and types.

Meachem Gear-cutting equipment will handle work up to the following limits:

Spur Gears up to 60-inch diameter
Planed Bevel Gears up to 48-inch diameter
Generated Bevel Gears up to 18-inch diameter
Spiral Gears up to 22-inch diameter

The location of the Meachem Gear factory on the New York Central Railroad at Syracuse, New York, permits immediate delivery on board cars at the main line of a trunk railroad and assures quick shipment to all points.

CUT GEARS:

Meachem Standard or Special Gears can be furnished in iron, steel, bronze, *new process* rawhide, fibre, formica, or any other material and to meet any specifications of composition or physical properties. Manufacturers find that by using Meachem Gear Service for all their gear work as well as for gear replacements, they are able to assure for themselves uniformly high grade gears, delivered promptly and at less cost than if made in their own shops.

NEW PROCESS RAWHIDE GEARS AND PINIONS:

New process Rawhide Gears and Pinions are manufactured solely by the Meachem Gear Corporation. They are cut from rawhide and are still made under the direction of the men responsible for every stage in their development. Gears and pinions made from *new process* rawhide are not only permanently quiet but durable as well and are particularly advantageous on high speed motor drives.

RACKS:

Meachem Gear-making equipment includes special rack-cutting machines taking racks up to 2-inch face, 4 diametral pitch, and any length desired. (100)

Digitized by Google

REEVES PULLEY COMPANY

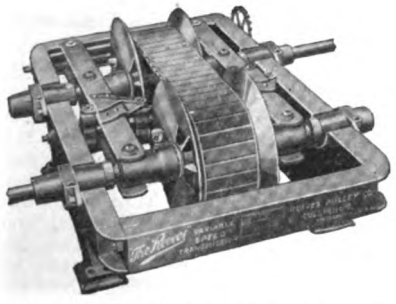
COLUMBUS, INDIANA

BRANCH HOUSE: CORNER CLINTON AND MONROE STS., CHICAGO

Sole Manufacturers of "The Reeves" Variable Speed Transmission, Wood Split Pulley and Wood Split Pulley Clutch

"The Reeves"

VARIABLE SPEED TRANSMISSION:



The original machine of practical design for giving speed variation to any machine whatsoever. Any desired speed may be secured instantly, without stopping—any gradation of speed between the fastest and slowest may be obtained.

"The Reeves" Variable Speed Transmission is installed like a countershaft. From its constant speed shaft you belt or gear to the motor, line shaft or other source of power. From its variable speed shaft you belt or gear to the machine on which the speed variation is desired.

The Transmission has been on the market for twenty-three years and has been applied to machinery in practically all industries. Its success has been so great that many manufacturers of machinery now incorporate the Transmission into their machine as an integral part.

It is built in sixteen sizes to transmit from 1 to 150 H. P.; and eight classes to provide variation of from 2 to 1 up to 12 to 1 speed range. It may hang from the ceiling, stand on the floor or be built into the machine it is to regulate.

The construction and operation of the Transmission are very simple. Two pairs of cone-shaped discs are spline-mounted on parallel shafts, and these discs may be moved laterally. A special V-shaped belt drives from one pair of discs to the other. Two pairs of levers, operated by a right- and left-hand screw, move the discs so that, as one pair separates the other pair is brought together an equal distance. Thus the driving diameters, formed by the discs, are changed, which increases or decreases the speed of the variable shaft as desired. The speed is regulated by turning a hand wheel attached to the shifting screw.

Recent improvements—namely, lengthened disc hubs, keys running full length of shaft inside the frame, four-piece frame and much larger thrust bearings—tend to greatly add to the already long life of the Transmission.

"The Reeves"

WOOD SPLIT PULLEY:



"The Reeves" Wood Split Pulley is built of selected hardwood, thoroughly air- and kiln-dried and acclimated. Each segment is glued and double nailed; the arms are built into and become an integral part of the rim, and are placed edgewise to the load.

The construction of "The Reeves" Pulley has been conclusively proved correct through thirty-five years of service under all conceivable conditions.

"The Reeves" Pulley is more efficient than any metal pulley because:

First—A belt adheres to a wooden surface much better than to one of steel or iron, and thus transmits from 20% to 30% more power with equal belt tension.
Second—There is a saving of from 50% to 75% in weight.
Third—because of this lighter weight there is a saving in power maintenance.
Fourth—No defects in material are possible with the laminated construction of "The Reeves," as every segment is rigidly inspected.

"The Reeves" Pulley is more efficient than any other Wood Split Pulley because:

First—Each segment, inside and out, is doubly nailed and glued.
Second—The arm is built up with the rim and actually forms a part of same.
Third—The segments are cut short, thus making not only a stronger rim but preventing it from getting out of true.
Fourth—There is an abundance of compression bolts, and each bolt is right up against the shaft where it grips the best.

A complete line of Taper Cone, Step Cone and Flanged Pulleys and Wooden Sheaves are also manufactured.

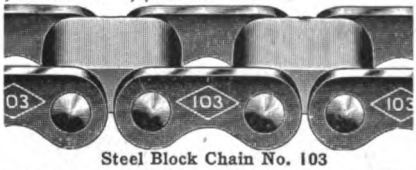
Digitized by Google

DIAMOND CHAIN & MFG. CO.

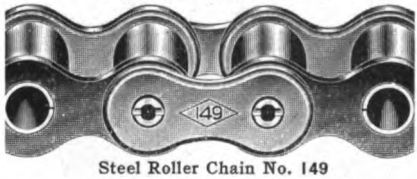
INDIANAPOLIS, U. S. A.

Makers of High Grade Chains Since 1890

The "Diamond" line of high grade steel block and roller chains offers a correct chain for every need of power transmission. It includes 70 models, ranging from ½ inch to 2 inch pitch and from ⅛ inch to 1¼ inch width.



Steel Block Chain No. 103

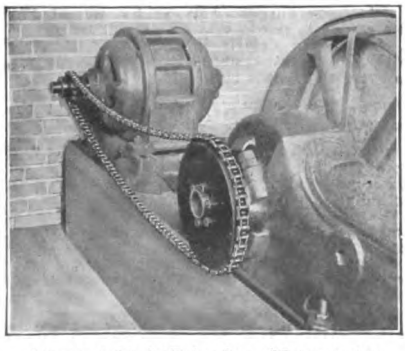


Steel Roller Chain No. 149

ADVANTAGES OF DIAMOND CHAINS:

320 The advantages of chain drives are, positive power transmission—accurate control—no slippage—efficient delivery of power—ability to absorb shocks and strains—low first cost and upkeep—long life and trouble-free service.

The superiorities of Diamond Chains are due to right design—use of special analysis steel—accurate machining—scientific heat treatment of bearing parts—skillful workmanship and rigid tests. These chains have proved highly successful on thousands of mechanical products. Investigate their adaptability to the machine you build. If you need special chains, we can produce a variety of designs.



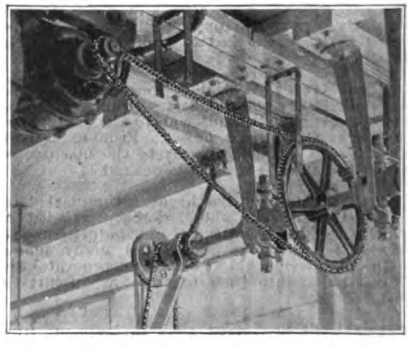
Diamond Chain Drive from Motor to Air Compressor

DIAMOND CHAINS ARE USED ON:

Bicycles, Motorcycles, and for Final Drives, Starter Drives and Fan Drives on Motor Cars, Trucks, Tractors and Marine Engines.

Farm Machinery: Binders, Balers, Churns, Cream Separators, Cultivators, Ditchers, Ensilage Cutters, Manure Spreaders, Spraying Outfits, Threshers, Tractors and Washing Machines.

Industrial Machinery: Bag-making Machines, Bakery Machines, Candy Machines, Clay-working Machines, Conveyors, Cordage Machines, Concrete Mixers, Drill Presses, Elevators and Hoists, Laundry Machines, Locomotive Stokers, Machine Tools, Mining Machines, Power Hammers, Printing Presses, Pumps, Street Sweepers, Textile Machines, Tire Machines, Wood-working Machines, etc. Also for *Motor-to-Line-Shaft Drives in Factories.*



Diamond Chain Drive from Motor-to-Line-Shaft and Line-Shaft-to-Machine

ENGINEERING SERVICE:

Our engineers with long experience on chain drives will be glad to help solve your power-drive problems. Send details of drive and get their recommendation. This service is free.

DIAMOND SPROCKETS MADE TO ORDER:

We are well equipped to manufacture sprockets of machine steel, forged steel, steel castings or gray iron castings, with teeth cut to our improved tooth-form. Tell us your sprocket requirements and get our estimates.

Digitized by Google

MORSE CHAIN COMPANY

ITHACA, N. Y.

ADDRESS NEAREST OFFICE

BALTIMORE, MD., 1402 Lexington Bldg.
BOSTON, MASS., 141 Milk Street
CHICAGO, ILL., Merchants Loan and Trust Bldg.
CLEVELAND, OHIO, 421 Engineers Bldg.
DETROIT, MICH., 8th and Abbott Sts.
CHARLOTTE, N. C., 404 Commercial Bank Bldg.
NEW YORK CITY, 50 Church St., Hudson Term. Bldg.
PHILADELPHIA, PA., 808 Harrison Bldg.
PITTSBURGH, PA., Westinghouse Bldg.
SAN FRANCISCO, CAL., Monadnock Bldg.
ATLANTA, GA., Earl F. Scott & Co., 702 Candler Building
CANADA, Jones & Glasco, Reg'd, Montreal, St. Nicholas Bldg., Toronto, Bank of Hamilton Bldg.
KANSAS CITY, MO., Morse Engineering Co., Finance Building
MINNEAPOLIS, MINN., Strong-Scott Mfg. Co., 413 Third Street, S.
ST. LOUIS, MO., Morse Engineering Co., Chemical Building.

Product:

MORSE SILENT CHAIN
99% Efficiency



Morse frictionless "Rocker Joint" Silent Chains and Sprockets—a high speed, positive, and flexible drive of many and varied applications, which maintains an efficiency of over 99% by actual test, a claim that can be made by no other manufacturer of silent chains. From ¼ H. P. to 5,000 H. P. For High or Low Speed.

Difference:

The difference between the Morse Silent Chain and all other types is in that unseen and all-important part, the joint. The MORSE is constructed with the undeniable fact always in view—the joint must bear the burden of service in any chain. Instead of a single pin, as in other joints, two special pins, both seated, form the joint. No bushing is required. As the chain bends in circling each sprocket the curved side of one pin rolls or rocks against the broad, flat side of the other, eliminating destructive sliding friction entirely. When on the straight run between sprockets, the flat sides of both pins are brought together, holding the chain steady and true.

Speed and Service:

This exclusive "Rocker Joint" construction enables the MORSE to run at a speed far in excess of other chains because lubricant is not essential to its operation; and after years of experimentation (in nearly every line of industry) it is accepted as the most durable chain on the market.

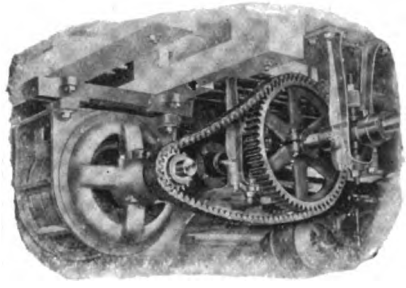
MORSE CHAIN COMPANY ITHACA, NEW YORK

SEE OUR ADVTR. IN MECHANICAL ENGINEERING THE JOURNAL OF THE ASME

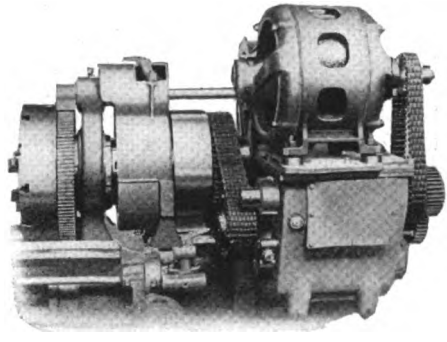
Engineering Assistance:

Our corps of engineers with years of experience in designing and installing millions of horsepower chain drives will assist you to solve your transmission problems.

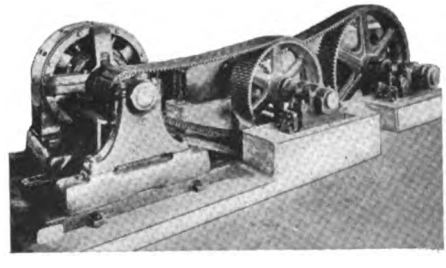
This service is rendered gratis. Get in touch with them NOW.



Overhead Line Shaft Drive



Typical Example: Morse Silent Chain as Positive Speed Ratio Drive in Head of Gisholt Lathe



Reversing Drive

Digitized by Google

AMERICAN PULLEY COMPANY

4200 WISSAHICKON AVE., PHILADELPHIA

BRANCH STORES:

NEW YORK	BOSTON	CHICAGO	SEATTLE	SAN FRANCISCO
33-35 Greene St.	165 Pearl St.	114-116 S. Clinton St.	536 First Ave., So.	14 Natoma St.

Wrought Steel Belt and Sash Pulleys and Pressed Steel Shapes

The Success of the "American" is in its Ability to do its Work Better Than Any Other.

AMERICAN STEEL SPLIT PULLEYS



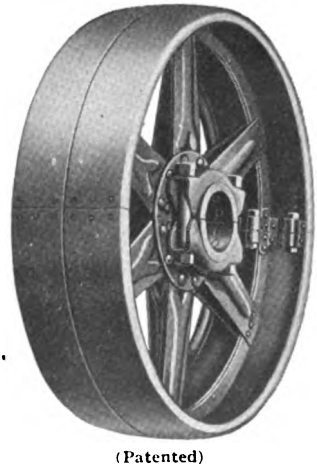
(Patented)

3", 4", 5" and 6" DIAMETERS

Note the sturdy construction. These small pulleys are as perfect in their way as larger "American" Pulleys.

If there were a better way to make a pulley, the "American" would be made
322 that way, for tests have been made continually in the effort to reach the ideal.

For 25 years "American" Pulleys have been refined. Sometimes little details have been added or altered to reach the ideal in power transmission, but never has the basic principle required a change.



(Patented)

INTERMEDIATE SIZES

Provided with grooved air escape. Six flat "A" braced arms (edge on) give great rigidity and least air resistance.

Belt slip, air fanning, weight, and every detail of power waste has been studied from every angle to insure maximum power transmission.

When there is a pulley, that will perform its work a little better than any other, then you owe it to yourself to use that pulley.

"Getting Maximum Pulley Efficiency," is a booklet that shows many details that must be considered in power transmission. Yours for the asking.

AMERICAN Steel-Split Pulleys:

Listed sizes 3" to 120" in diameter.
Crown and Straight faces.
Interchangeable bushings.

All pulleys above 6" diameter have a grooved face.

No set screws or keyways unless for unusually heavy duty.

Carried in stock by over 290 dealers in the United States and Canada. See Donnelley's Red Book for your nearest dealer.



(Patented)

44" TO 82" DIAMETER

Larger diameters up to 120" with faces wider than 16", of similiar design—with more arms and stronger hub. Grooved air escape.

Digitized by Google

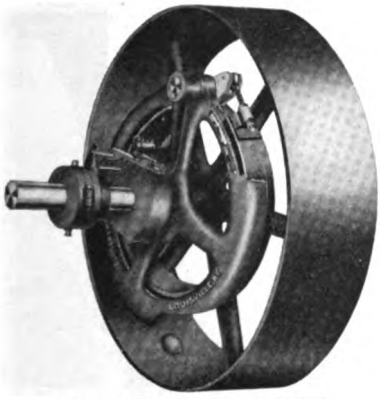
THE W. E. CALDWELL CO.

Established 1884

340 EAST BRANDEIS ST., LOUISVILLE, KY.

Manufacturers of Friction Clutches and Power Transmission Machinery

CALDWELL FRICTION CLUTCHES:



Caldwell Friction Clutch Pulley

The notable features of this clutch are its simplicity, strength, ease and perfection of adjustment and freedom from breakage.

The basic principle is identical with that of the standard automobile service brake; a flexible band, lined with asbestos and tightened with a lever. In practice it has given equal service with that much used and abused device.

There are only eleven parts. All are designed to have their greatest strength in the direction of the greatest stress and all small parts of steel.

There is only one adjustment. One screw shortens or lengthens the band and gives all the adjustment necessary. This is so simple that it can be easily and correctly maintained by anyone.

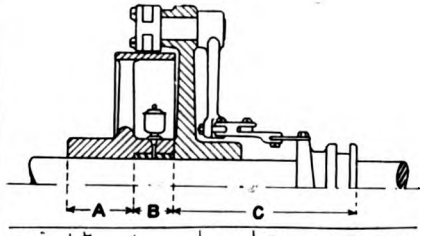
Most clutch breakages are caused by having one of several adjustments too tight and thus causing one part to carry the entire load instead of the one-fourth or one-sixth that it was designed to carry. This cannot happen with the Caldwell clutch. It is therefore immune from this as well as a number of other clutch troubles.

It is easy to operate as the lever is moved by a toggle link which gives increased power as the stress increases. This and the fact that the band grips the entire circumference of the friction ring gives it great pulling power.

We furnish the Caldwell clutch in the form of friction clutch pulleys, gears, sheaves or sprockets, as cut-off couplings or with an extended hub so that a separate pulley, sheave, sprocket or gear can be attached.

When not specified we furnish a bronze tube bushing but we recommend our cast split removable phosphor bronze bushing.

DIMENSIONS OF CALDWELL FRICTION CLUTCH COUPLINGS



Diameter of Clutch, Inches	Horsepower at 1000 R. P. M.	Swings Inside of Inches	Largest Bore, Inches	Space on Shaft in Inches		
				A	B	C
6	1	10 7/8	2 1/2	2 1/2	1 1/2	7 1/4
8	2	12 7/8	2 1/2	2 1/2	1 1/2	7 1/4
10	4	16	3 1/4	3 1/8	2	9 1/8
12	6	18	3 1/4	3 5/8	2	9 3/8
14	10	21	4	4	2 1/2	11 1/4
16	13	23	4	4 1/2	2 1/2	11 3/4
18	21	25 1/2	4 1/2	4 3/4	3	13 1/2
20	26	27 1/2	4 1/2	5	3	13 3/4
22	32	30 3/8	5	5 3/8	3 1/2	15 3/8
24	38	32 3/8	5	5 3/4	3 1/2	15 3/4
27	48	36 3/8	5 1/2	6	4 1/4	17 1/2
30	60	39 1/2	5 1/2	6 3/4	4 1/4	18 1/4
36	105	46 7/8	6 1/4	7 1/2	5	20 3/4
42	145	52 7/8	7 1/2	8 1/4	5	21 1/4
48	190	61 1/2	8	9	6	24
54	240	67 3/4	9	9 3/4	6	24 3/4

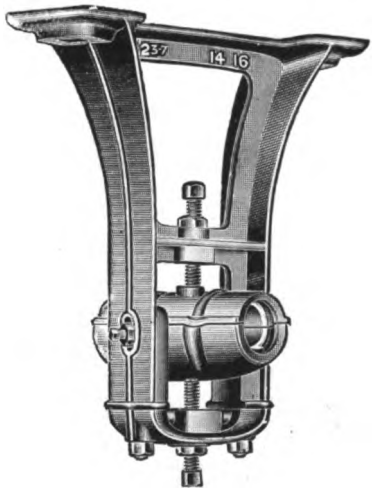
Digitized by Google

CHICAGO PULLEY & SHAFTING CO.

MAIN OFFICE
30 So. Clinton St.,
CHICAGO, ILL.

FACTORY
Menomonee Falls
WISCONSIN

Makers of the CHICAGO Line, a Complete Line of Power Transmitting Appliances



324

The CHICAGO
Adjustable Ball and Socket Drop Hanger
and
Floor Stand:

Well designed, made of the best materials, has great strength.

Furnished with either plain, ball or roller bearings.

The CHICAGO line also includes:

Pillow Blocks
Post Hangers
Bracket Hangers
Clutches
Collars
Couplings



The MARVEL Steel Hanger:

Made only by the makers of the CHICAGO line in their own plant.

The Marvel Steel Hanger has all of the advantages of a steel hanger, with none of the disadvantages of cast iron.

MARVEL Steel Hangers are one-third the weight of ordinary cast iron hangers, with double the strength, and cost no more. They are less expensive to handle, haul and erect. They are strong, rigid, with the danger of breakage entirely eliminated. Complete interchangeability of bearings.

All sizes up to 3" shaft x 24" drop.

There is also a MARVEL Steel Countershaft Hanger.

Digitized by Google

CHICAGO PULLEY & SHAFTING CO., CHICAGO, ILL.

Ball Bearing Specialties of
The CHICAGO Line
are:

Daggett Ball Bearing Loose Pulleys

"All Loose" Countershaft Drives

Ball Bearing Clutch Pulleys

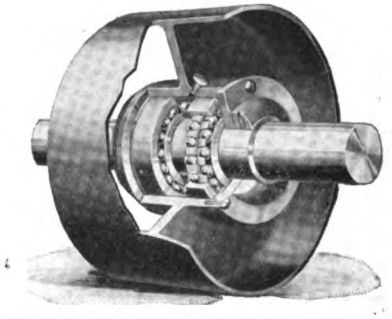
Ball Bearing Friction Sleeve Clutches

Marvel Grinders



MARVEL Grinders:

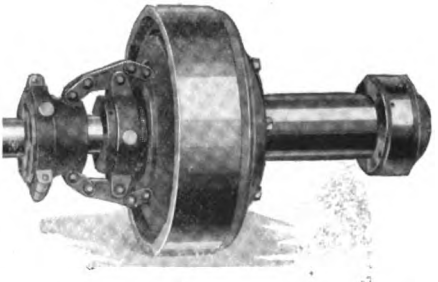
The MARVEL Grinder, ball bearing equipped, permits high spindle speeds, with an assurance of long life, low upkeep and continuous service.



Ball Bearing Loose Pulleys:

The CHICAGO Line Ball Bearing Loose Pulleys are especially designed for high speed. They are simple in construction, accurately machined and will carry a belt at any working load or speed without heating or sticking. They are dustproof, clean, noiseless and require but a small amount of lubricant a few times a year.

CHICAGO Loose Pulleys eliminate the loose pulley trouble prevalent in practically every plant where loose pulleys are used.



Ball Bearing Friction Sleeve Clutch:

Well designed and constructed. Compact, strong and easily applied. Is made with an extension sleeve to accommodate steel, wood or any other kind or type of split pulleys.

Digitized by Google

DODGE SALES & ENGINEERING CO.

Distributor of the products of

DODGE MFG. CO., MISHAWAKA, IND.

15 Branch Warehouses in the United States **Dealers in Every Representative City**

Designers and Builders of Everything for the Mechanical Transmission of Power

In these days when "DELIVERY" is considered of equal importance with "QUALITY," there is a double reason for your specifying "Dodge" pulleys.

DODGE PULLEYS constitute the standard of the world in design, strength, interchangeability, service and prompt delivery.

Dodge "Independence" Wood Split Pulleys are 40 per cent to 80 per cent lower in price than any pulley made from any kind of metal.

They will stand up under any double belt service and will run successfully at any practicable speed.

Dodge Wood Split Pulleys are guaranteed. If they fail in any way to satisfactorily perform the function of a stock pulley, they may be returned and full credit will be allowed.



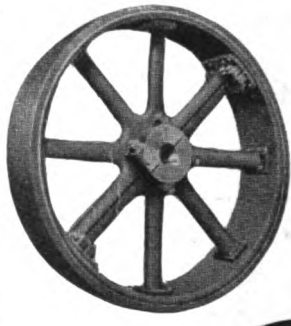
"Independence" Wood Split Pulleys are lighter, stronger, steadier, than any other pulleys of their type; they insure the maximum tractive pull of belts and are guaranteed to give satisfactory service.



The Dodge "Standard" Iron Split Pulley is America's ideal service pulley. It is easily put up or taken down, and will fit shafting of all regular sizes. There are no rivets to shear or joints to work loose.

The Dodge "Standard" Iron Split Pulley is impervious to the weather, to water, to steam or acid fumes.

The Dodge "Standard" Iron Split Pulley does not become distorted under strain; it is perfectly round and gives a full 100 per cent belt contact.



Split iron center wood rim pulley—for shock loads, heavy service and high speeds.

Split Iron center wood rim pulley with double arms, especially adapted for high speed, heavy and shock loads.

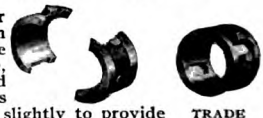




The Dodge Interchangeable Bushing system makes possible the application of a pulley to any size of shaft within the range of standard bores as follows:

3″ diameter	1½″ bore
4″ diameter	2 ″ bore
5 to 7″ diameter	2 1/16″ bore
8 to 23″ diameter	3 ″ bore
24 to 48″ diameter	3½″ bore
50 to 72″ diameter	4½″ bore

Bushings for Standard Iron Splits are made and finished whole, then cracked, and the fractured edges are dressed away slightly to provide for proper clamping clearance.



TRADE D MARK

Two complete bushings are required for each pulley, one for each end of the pulley hub.

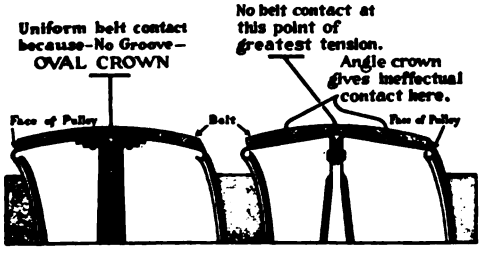
Digitized by Google

DODGE SALES & ENGINEERING CO. MISHAWAKA, IND.

ONEIDA AND KEYSTONE STEEL SPLIT PULLEYS:

Are now sold exclusively by the Dodge Sales and Engineering Company. The marked superiority of these steel pulleys over all similar products is at once evident to any one familiar with pulley construction.

Both Oneida and Keystone pulleys possess the true oval crown rim which makes for greater uniform belt contact, because of the absence of a groove at the point of greatest tension, such as is found in other types of steel pulleys.



Throughout the construction of both Oneida and Keystone pulleys, wherever two pieces of metal are riveted together, these metals are counter-locked male and female so that there is positively no shearing or lateral strain on the rivets.



"Oneida" Steel Split Pulley

Oneida and Keystone pulleys are made in all sizes up to very large belt wheels for main engine drives.

Valuable literature on the subject of steel pulleys will be sent to anyone on request.



The New "Keystone" Steel Split Pulley

NATIONAL STEEL PULLEYS:

Are made in 3, 4, 5 and 6″ diameters, 3″ to 6″ faces, and fill a long-felt want for a strong, efficient, satisfactory small pulley.

The National pulley has all the advantages of the bushing system, and, being instantly available from dealer's stock, has attained wide popularity



"National" Steel Split Pulley

National pulleys are suitable for use on small motors, dynamos, wood or metal working machinery, and, in fact, in all places requiring small, well-balanced, efficient pulleys.

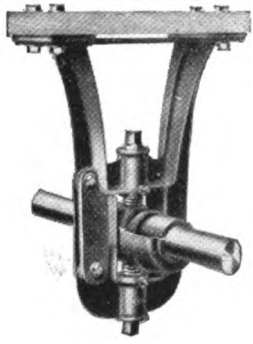
(Continued on next pages)

Digitized by Google

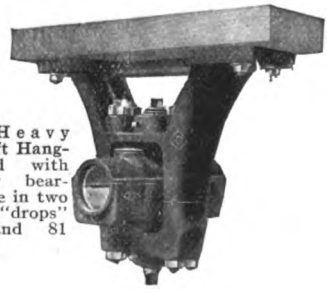
(Continued from preceding pages)

DODGE SALES & ENGINEERING CO. MISHAWAKA, IND.

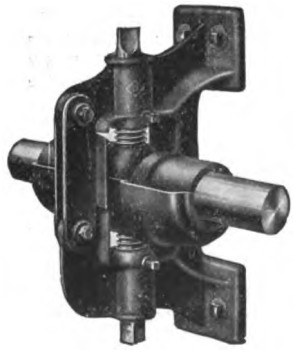
For pleasing appearance, ample strength, wide adjustability, easy erection, perfect alignment, and general mechanical quality there has never been produced an equal to the DODGE DOUBLE BRACE BALL-AND-SOCKET HANGER, made in both "drop" and "post" styles.



The Dodge Drop Hanger is ball-and-socket in its fitting.



328 Dodge Heavy Head Shaft Hangers fitted with Ring-oiling bearing. Made in two standard "drops" of 12 and 81 inches.



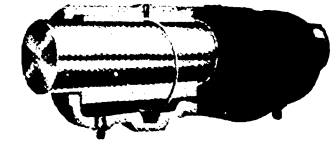
Adjustable Ball-and-Socket Post Hanger with Standard and Self-oiling Bearings. Ample adjustment; machined base.

Designed for the utmost strength in form and proportion, it is nevertheless of pleasing appearance in its lines of symmetry and its distribution of metal. To the mechanical eye, these features are all quite in harmony, each having its share in creating and sustaining an impression of confidence in the general excellence.

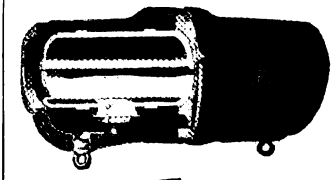
In the new Dodge Catalog the subject of hangers and bearings is discussed fully. Correct engineering tables are given as well as suggestions for a wide number of uses of hangers; pillow blocks, floor stands, etc.



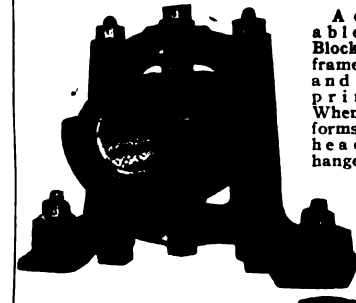
Plain Bearing



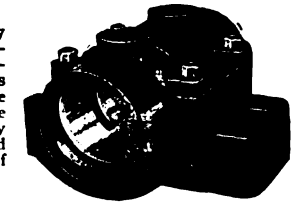
Ring Bearing



Capillary Bearing



Adjustable Pillow Block has open frame and ball-and-socket principle. When inverted forms a short head haft hanger.



Capillary and Ring-oiling Rigid Pillow Blocks adapted to the most severe service. May be ordered with dust-proof ends.



Common Flat Box for use under conditions where moderate powers are involved and where heavier self-oiling equipment is unnecessary.

"DODGE" BEARING METAL is intended for use under all general conditions, the "Copper Hardened" brand being better suited for places where there is considerable vibration, knock or pound to contend with.

Our "Genuine" brand is intended for use in bearings where heavy crushing strains are involved. We make a brand of metal for every service condition.

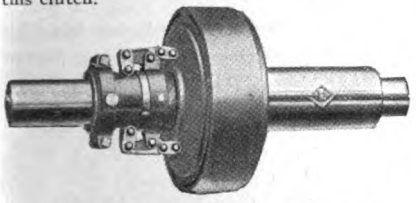
Digitized by Google

DODGE SALES & ENGINEERING CO. MISHAWAKA, IND.

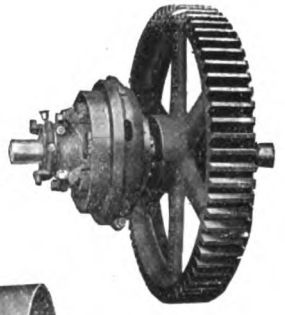
THE DODGE SOLID FRICTION CLUTCH:

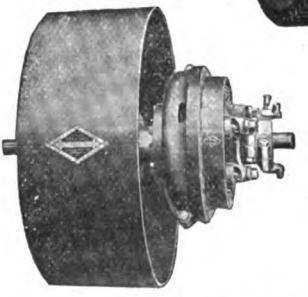
Is particularly adapted for countershaft use, and other places where a solid type of clutch can be advantageously employed, and where the power requirements are within the range of capacities offered in this style of construction.

Any kind of a pulley—wood, iron center, wood rim or iron, and either solid or split—or any gear, sprocket or sheave wheel, can be used upon this clutch.



Dodge Split Friction Clutch with Spur Gear.





Dodge Split Friction Clutch with Dodge Split Iron Pulley.

Rated Capacities of Dodge Solid Friction Clutches when Operating at Speeds Shown

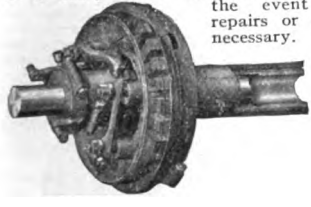
Size of Clutch	REVOLUTIONS PER MINUTE									Maximum Speed	Maximum Bore	
	100	150	200	250	300	350	400	450	500		Reg.	Spec.
	H. P.	H. P.	H. P.	H. P.	H. P.	H. P.	H. P.	H. P.	H. P.			
4"	1¼	1⅞	2½	3⅛	3¾	4	4½	5	5½	600	1¼"	
5"	2	3	4	5	5¾	6½	7	8	9	580	1½"	
6"	3	4	6	7	8½	9	10	11	12	560	1¾"	
7"	4	6	8	10	11	12	13	15	16	540	2"	
8"	5	7	10	12	14	15	17	18	19	520	2¼"	
9"	6	9	12	15	17	19	20	22	23	500	2½"	
10"	10	15	20	25	28	31	36	39	40	480	3 "	
12"	15	22	30	37	43	47	51	59	....	440	3 "	4"
14"	30	45	60	75	85	95	102	....	....	400	3½"	5"
16"	50	75	100	125	142	157	170	....	....	360	4½"	6"

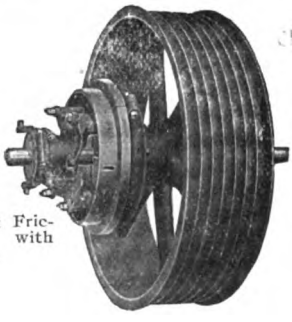
DODGE PATENT SPLIT FRICTION CLUTCHES:

Make possible two things of great importance and value:

(1) The easy and ready installation of the equipment upon a shaft already in place without taking down the shaft or disturbing any of the equipment upon same, and

(2) The greatest possible facility in the taking off of old parts and the substitution of new, in the event that any repairs or renewals are necessary.





Dodge Split Friction Clutch with Rope Sheave.

Rated Horse Power Capacities of Dodge Split Clutches

Size of Clutch	REVOLUTIONS PER MINUTE							*Maximum Speeds		Maximum Bore
	100	150	200	250	300	350	400	C. I. Sleeves	Bab. Sleeves and Quills	
	H. P.	H. P.	H. P.	H. P.	H. P.	H. P.	H. P.			
10	6	9	12	15	17	19	20	250	450	2⅛
12	10	15	20	25	28	31	34	250	440	3
14	15	22	30	37	47	51	51	250	430	3½
16	20	30	40	50	57	63	68	250	420	4½
18	25	37	50	62	71	79	85	250	410	5
20	32	45	64	80	91	100	109	250	400	6
22	40	60	80	100	114	126	....	250	390	6
24	50	75	100	125	142	157	....	250	380	6½
28	80	120	160	200	228	252	....	.....	360	7
30	96	147	196	245	280	309	....	.....	350	7½
36	128	192	256	320	365	....	....	.....	325	8
42	174	261	348	435	495	....	....	.....	300	10
48	242	363	484	605	....	....	....	.....	275	10
54	340	510	680	850	....	....	....	.....	250	12
60	480	720	960	....	....	....	....	.....	225	12

THE DODGE PATENT SPLIT FRICTION CUT-OFF COUPLING:

Is used for the purpose of connecting two sections of shafting in such way that one section can be stopped or started at will while the other section is operated continuously.

The mechanism of the Dodge Patent Split Friction Cut-Off Coupling is the same as is employed with the friction clutch for use with pulleys, gears, sheaves or sprockets. Instead, however, of the extended loose sleeve, a hub part is used, which is keyed to one of the shafts and provided with a bronze bushing for receiving the extended part of the other shaft to which is keyed the driving plate of the mechanism.

The subject of clutches is an important one and is fully described in the Dodge Book D-20-A, in addition to other special literature devoted to the subject. It will be sent on request.

(See pages 42, 43 for additional products of this Company)

Digitized by Google

THE FALLS CLUTCH & MACHINERY CO.

CUYAHOGA FALLS, OHIO
(SUBURB OF AKRON)

BRANCHES WITH COMPLETE STOCKS

NEW YORK, N. Y.
206–208 Fulton St.

BOSTON, MASS.
52–56 Purchase St.

CINCINNATI, OHIO
208–214 Elm St.

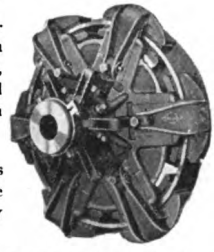
WESTERN SALES OFFICE
SCHWARZ ENGINEERING CO.
DENVER, COLORADO

Engineers, Founders, Machinists—Manufacturers of Power Transmission Machinery

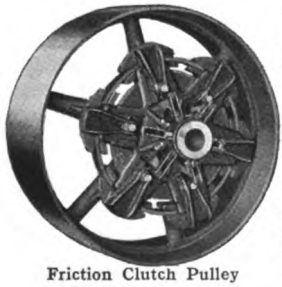
FALLS FRICTION CLUTCHES:

Friction Clutch Cut-off Couplings, Friction Clutches for Gears, Sprockets, Sheaves and Pulleys, Silent Chain Drives.

Falls Friction Clutches are built in a complete line of sizes for any duty or installation.

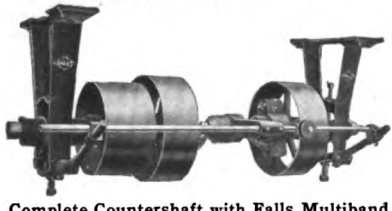


Friction Clutch Coupling



Friction Clutch Pulley

Friction Clutch Pulleys for Quill Drives, Head Shafts, Line Shafts, Countershafts, Gas Engines, Dynamos, Generators, Motors, Special Machinery, Double Throw or Duplex Friction Clutches for light or heavy duty.



Complete Countershaft with Falls Multiband Duplex Friction Clutch Pulleys

SHAFTING AND COUPLINGS:

Quills, Head Shafts, Line Shafts, Countershafts, Cold Rolled Steel Shafting, Hammered, Forged and Turned Shafts.



Flanged Coupling

Flanged Faced Couplings, Compression Couplings, Sleeve Couplings, Heavy Duty Couplings, Flexible Couplings.



Flexible Coupling

Solid and Split Safety Flanged Set Collars.

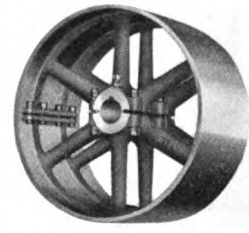
SHEAVES AND PULLEYS:

Complete Rope Drives and Sheaves for Manilla, Cotton Wire and Composition Rope, Complete Belt Drives, Tighteners, Idlers, and Mule Stands, Solid and Split Cast Iron Pulleys, Tight and Loose Pulleys, Flanged Pulleys, Motor Pulleys, High Speed Pulleys, Heavy Duty Pulleys, Fly-Wheels, Taper and Step Cone Pulleys.

Head Shaft, Line Shaft, Countershaft and Conveyor Pulleys.



Split Multiple Groove Sheave



Split Double Arm Pulley

SEE OUR ADVTS IN MECHANICAL ENGINEERING THE JOURNAL OF THE A·S·M·E



Heavy Duty Rolling Mill Pulleys

BEARINGS AND HANGERS:

Bearings, Pillow Blocks, Base Plates, Floorstands, Plain Pillow Blocks, Ring Oiling Pillow Blocks and Bearings for Light and Heavy Duty. Drop Hangers and Post and Wall Hangers. Special Bearings.



Rigid Ring Oiling Pillow Block

Digitized by Google

THE HILL CLUTCH CO.

CLEVELAND, OHIO

EASTERN SALES OFFICE: NEW YORK, N. Y., 50 CHURCH ST.—TELEPHONE CORTLANDT 8078

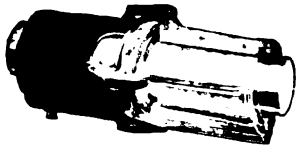
Power Transmission Machinery

PRODUCTS:

HILL COLLAR OILING BEARINGS; HILL FRICTION CLUTCHES (Smith Type).

Hill Rope Drives, Belt Tighteners, Drop Hangers, Floor Stands, Shafting, Couplings, Cast Iron Pulleys, Rope Sheaves, Gears, Sprockets, Flywheels, Bench Legs, Concrete Inserts, Gray Iron Castings, Special Machinery.

HILL COLLAR OILING BEARINGS:



Sectional View Hill Collar Oiling Bearing, Cleveland Type, Patented

In the Hill Collar Oiling bearing, instead of depending upon a loose ring or chain for conveying the oil to the journal, a fixed collar is employed, thus providing a positive means of elevating the oil.

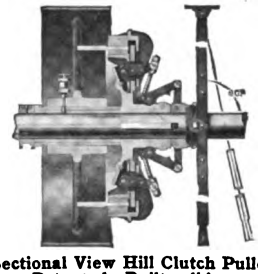
In the Cleveland Type Hill Collar Oiling bearing, the oil stored in a reservoir in the bottom of the bearing is continuously elevated by a heavy split collar. Metal wipers deflect the oil, which is then distributed along the full length of the journal. Two or three revolutions of the shaft and the bearing is thoroughly lubricated. It is not only in the positive and copious means of oiling that the Collar Oiling bearing excels, for the collar also serves as a thrust collar, and operates in a bath of oil and thrusts against babbitted seats. No outside collars are required, unless the end thrust is extremely severe. All other types of bearings require outside shaft collars, which bear iron against iron with no lubrication.

Hill Collar Oiling bearings are furnished in all forms of ball and socket and rigid mountings.

HILL FRICTION CLUTCHES:

SUPERIORITY—THE HILL CLUTCH CO. has unequalled facilities for the design and manufacture of friction clutches. For 38 years Hill power transmission machinery has been acknowledged to lead all others. No other manufacturer has had a wider experience in the manufacturing of friction clutches, and complete power transmission machinery equipment or a greater knowledge of the varying conditions of operation that must be met.

EFFICIENCY—The advantages of the Smith Type clutch lie in its unequalled mechanical stability, tremendous starting power, ease of adjustment, and removal of wearing parts.



Sectional View Hill Clutch Pulley, Smith Type, Patented. Built solid or split in sizes from 9 to 1300 H. P. at 100 R. P. M.

To obtain such rigidity all parts of the toggle mechanism are of steel and forgings, with the single exception of the connecting lever which is of cast iron.

The friction surfaces are wood to iron, which is a combination offering great frictional resistance. The wood shoes are made from the best grade of well seasoned maple. Large shoe area is supplied, and all of the shoe area is equally effective. The frictional resistance is the same at all points. This is due to the heavy cast iron jaws, rigid guides, and the balanced toggle action transmitting the pressure effort of the operator.

HILL ROPE DRIVES:

American and English Systems of Rope Drives designed, built and installed.

Digitized by Google

THE CARLYLE JOHNSON MACHINE COMPANY

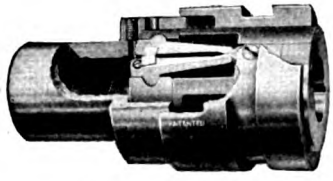
MANCHESTER, CONN., U. S. A.

Manufacturers of Friction Clutches, Cut-off Coupling Clutches, Marine Reverse Gears, Marine Motors

THE JOHNSON FRICTION CLUTCH:

A Small, Compact, Light Powered Clutch for Use on Overhead Shafting and on Machinery of all kinds.

Write for our Black Catalog and Booklet "Clutches, as Applied to Machine Building."



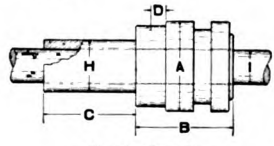
Johnson Single Clutch

Section Broken Away, Showing Clutch Disengaged

Construction: As seen by the illustration, this type of Clutch has but few parts, is very compact, and is entirely enclosed in a round, smooth casing. A body fastened to the shaft carries a split ring in which are inserted a pair of levers. A curve-shaped wedge, which is made part of a shipper sleeve, forces the levers apart, expanding the ring, bringing its outer surface into frictional contact with the inner surface of the friction cup, the hub of which is made to suit requirements. The leverage is so compounded that it requires but little pressure to operate the Clutch. One screw which moves two taper blocks, set into the levers, adjusts the contact of the ring and cup to any tension. This is easily reached with a screwdriver, through hole in the friction cup.

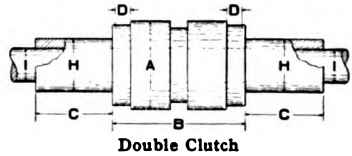
The Johnson Clutch is also made in a double type, which requires but little more space than the single, and has two friction cups with hubs, on which can be mounted standard pulleys, cones, gears, etc., of any diameter and face.

We maintain a comprehensive stock of all standard sizes for immediate delivery. In addition to this, the standard clutch is easily modified to meet any requirements, and we are thoroughly equipped for handling such special work promptly and efficiently.



Single Clutch

SEE OUR ADVTS. IN MECHANICAL ENGINEERING THE JOURNAL OF THE A.S.M.E.



Double Clutch

DIMENSIONS OF STANDARD SINGLE AND DOUBLE CLUTCHES

Clutch Size Number	H. P. per 100 R. P.M.	Max. Bore I	DIMENSIONS, INCHES					WEIGHT	
			A	B Single	B Double	C	D Throw to Engage Clutch	Single	Double
0	½	1 1/16"	3 3/16"	3¼"	5 "	3 "	1/16"	10 lbs.	20 lbs.
2	¾	1 1/16"	4 1/8"	4 1/16"	6 1/16"	4 "	1/16"	12 lbs.	25 lbs.
4	1	1 1/16"	4 5/8"	5 1/16"	7½"	5½"	1/16"	19 lbs.	32 lbs.
5	1½	1 13/16"	5 3/16"	5 1/16"	8 1/16"	6 "	1/16"	27 lbs.	43 lbs.
6	2	2 1/16"	5 13/16"	6 1/8"	8 5/8"	6½"	1 "	35 lbs.	54 lbs.
8	2½	2 1/16"	6 13/16"	6 13/16"	11 1/8"	8½"	1 "	53 lbs.	96 lbs.
10	3	2 13/16"	7 5/8"	5½"	8½"	8½"	1/16"	75 lbs.	110 lbs.
11	4	3 1/16"	9 1/16"	6 7/8"	10 1/16"	8½"	1 1/16"	130 lbs.	150 lbs.

Diameter of hub "H" must be at least 1" larger than shaft diameter. If a self-oiling bearing of any kind is used it must be at least 1¼" larger. The hub length "C" can be furnished in any dimension on special order.

Digitized by Google

MEDART PATENT PULLEY COMPANY

Engineering Sales Offices
PHILADELPHIA
CHICAGO

ST. LOUIS, MO.

Office and Warehouse
211 Vine Street
CINCINNATI

Specialists, not Alone in Pulleys, but Manufacturers of Every Appliance for Use in Connection with the Mechanical Transmission of Power, Including Turned and Polished Steel Shafting

MEDART

LINE SHAFTING EQUIPMENT:

Founded forty years ago, with the Medart patented Steel Rim Pulley as the nucleus, our business has experienced a gradual well-planned development in the single field of making complete equipment for the mechanical transmission of power, and in building Machinery also for straightening, turning and polishing round bars of steel, bronze, copper, etc. Today the name "Medart" is synonymous with "EVERYTHING in Line Shafting Equipment," and "the best Machinery for straightening and turning round metal bars," particularly of steel.

Although common impression, due to our corporate name perhaps, has been that the name "Medart" means "Specialists in Pulleys alone," the facts are that Pulleys—every type: Cast Iron, Wood Split, and Steel Rim—constitute only a small percentage of our production, and we are importantly engaged in the manufacture of Turned and Polished Steel Shafting, Couplings, Collars, Hangers, Bearings, Bearing Supports, Friction Clutches, Gearing, Rope Sheaves, Belt Tighteners, American and English System Rope Drives and so on. In fact, we cover the mechanical transmission field, and have fully equipped some of the largest and best known plants that are noted for high efficiency.

SHAFTING:

That we are the only exclusive Manufacturers of a complete line of power transmission machinery which manufactures shafting in our own mill, on a basis permitting us to quote Mill Prices, is something Engineers and Buyers should keep in mind when securing proposals covering tentative Line Shafting installations. Shafting in any considerable overhead equipment comprises a heavy percentage of the total tonnage involved. Hence, we are able to quote very attractively covering all Line Shafting Equipments. It will be to your great advantage to secure all your overhead equipment from one source of supply—at a saving.

"Medart" Shafting is produced by the Turning and Polishing process.

TRANSMISSION APPLIANCES:

Our Flange Couplings are all male and female design. We fit them to shafts under hydraulic pressure and afterwards face off to insure true alignment. Also we offer Compression Keyed-on, Three-part Keyless, Universal Joint and Jaw Clutch type Couplings.

Our line of Hangers and Bearings and Bearing Supports includes different types, all heavy and well designed. Hanger Frames are of the 4-Way Adjustment types. Bearings are either Ring, Collar or Wick Oiling or fitted with Grease Cups —adapted for Ball and Socket or Screw Adjustment. Pillow Blocks of every style, including Base Plates, Wall Boxes, Floor Stands, Brackets, etc.

Our V-Groove type Friction Clutch, having an interchangeable Sleeve to which may be fitted either a Pulley, Gear, Sprocket or Rope Sheave, made solid or split construction, is noted for its great strength, matchless frictional power, simplicity and long life in service. Is adapted for conversion to Cut-off Couplings.

PULLEYS:

Our Steel Rim Pulley—light in weight, perfect in balance—is superior to any possible construction of pressed and riveted sheet steel, because stronger, stiffer, and will stay round. Made all sizes up to 16 feet diameter and 50 inches face. Our equipment for manufacture of Cast Iron Pulleys, 3 inches to 16 feet diameter, is complete from the best foundry conditions and the most modern types moulding machines to the highest efficiency in machine shop practice. Medart Wood Split Pulleys do the work —and they'll last as long as the shafting will last.

Our heavy duty "Hercules" all-steel pulley is matchless. It'll withstand successfully more abuse than any other make or construction of pulley. They are built to suit specific conditions, and guaranteed on a money-back basis.

Gears: It doesn't matter what you need in Gears—we can build them. We have thousands of patterns, and, besides, the most efficient moulding machines and gear cutting shop equipment.

Send for our General Catalog and Discounts. Let us quote your next specifications.



Digitized by Google

T. B. WOOD'S SONS COMPANY

CHAMBERSBURG, PA.

Manufacturing Engineers, Power Transmission Machinery

SHAFTING:



Showing Different Forms of Keyseats

We are prepared to furnish shafting of the best steel in diameters up to 24", made perfectly round and straight, thereby insuring easy running and also minimum loss of power.

SAFETY SET COLLARS:

These are made either Solid or Split, bored to fit any size of shafting. Finished all over and fitted with hardened Set Screws. Constructed so that all bolts and Set Screws are protected by flanges projecting beyond heads and nuts. The heads of all Clamping Bolts in Split Collars are slotted.

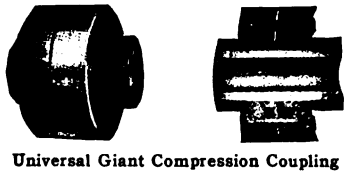


Safety Set Collars

We also supply Concealed Fast Collars forged from bar steel, bored slightly under size, shrunk on shaft, then turned and finished on shaft centers, thereby insuring a true running collar.

COUPLINGS:

This line consists of Flange or Plate Couplings, Male and Female, or Standard Plain Face type. Double Cone and Universal Giant Compression Couplings, the latter being the Coupling that requires



Universal Giant Compression Coupling

no keys. Ribbed Compression Couplings, Shifting Jaw Clutch Couplings, either Spiral or Square Jaws, Solid Sleeve, Universal Joint Couplings, and Flexible Couplings.

HANGERS:

Our line consists of many different types of Hangers all of a modern design, possessing unique adjusting and power-saving features, fitted with Ring Oiling, Chain Oiling or Plain Grease Cup Bearings.



Hanger

We are also prepared to equip Hangers with Closed End Bearings and Bearings recessed for Collars. This line comprises Line Shaft, Heavy and Extra Heavy Head-shaft Drop Hangers, Post Hangers and Bracket Hangers, all being made in both the Ball and Socket and Four Set Screw or Peerless Type.

We also supply Adjustable Girder Clamps of a unique design, Countershaft Parts or Complete Countershafts.

PILLOW BLOCKS, ETC.:

From our many different patterns we are prepared to supply Rigid and Adjustable Pillow Blocks suitable for operation under various conditions. This classification comprises Plain Flat Boxes, Standard Rigid, Wick, Ring and Chain Oiling Rigid Pillow Blocks and Post Hangers; Solid Journal Boxes, Ball and Socket and Four Set Screw Ring Oiling Adjustable Pillow Blocks; also Plain or Wedge Adjustable Base Plates; Cast Iron and Steel Arch Wall Frames; Cast Iron Wall Brackets, Plain and Wedge Adjustable Ball and Socket Floor Stands, and Fire Wall Sleeves.

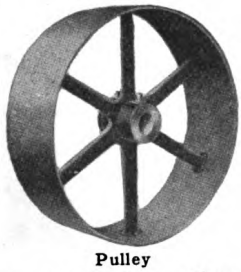


Pillow Block

Digitized by Google

T. B. WOOD'S SONS COMPANY CHAMBERSBURG, PA.

PULLEYS:

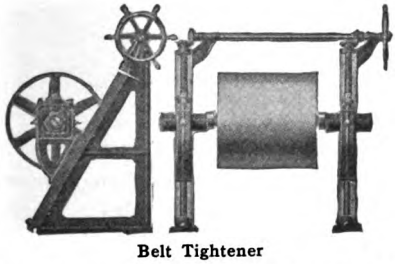


Pulley

We manufacture Cast Iron Pulleys only, of a correct design having metal properly distributed, same being carefully finished and balanced. This type of pulley we believe superior to others as it is permanent and suited to a wider range of service. We are prepared to furnish Cast Iron Pulleys of every description.

BELT TIGHTENERS, ETC.:

This line comprises Belt Tighteners made with "A" Frames and Vertical Side Frames, all with Screw Adjustment; in addition, Rack and Pinion Tighteners



Belt Tightener

for Horizontal or Vertical use, also swinging tighteners. We are also prepared to furnish Stationary and Adjustable Mule Pulley Stands, Single and Double Brace Binder Frames and Guide Pulleys.

UNIVERSAL GIANT FRICTION CLUTCHES:

These Clutches are of the Disc Type, of a consistent design throughout and are made either solid or split, the same type of construction being used for all sizes and all speeds. The Clutch is complete within itself either for use as a cut-off coupling or for use in connection with ordinary Pulleys, Gears, Rope Sheaves, Sprockets, or any regular or special part that it is desired to use as a driving or driven mechanism.



Universal Friction Clutch Pulley

The Sleeve and Body of this Clutch being independent, both are held rigidly in lateral position upon mounting and sustain no end thrust whatever when clutch is thrown in or out of engagement. The Friction Surfaces are protected from dust, dirt and other foreign substances. If desired, Clutch may be equipped with special cover to protect mechanism.

BELT AND CLUTCH SHIFTING MECHANISMS:

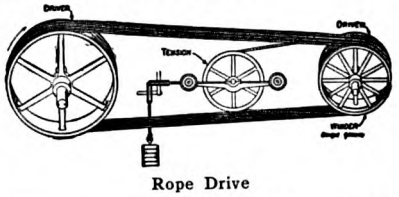


Compound Lever Shifter Stand

We supply Belt Shifters which may be attached to any of our Hangers. We also furnish for Friction Clutches, Fork and Lever Stands, Compound Levers, Worm Geared and Single or Double Spur Geared Shifter Stands.

335

ROPE TRANSMISSION:



Rope Drive

We are prepared to make complete installations of either English or American System Drives, and also to furnish Rope Sheaves with Grooves of every description; Tension Carriages, Track, Track Hangers and Tail Rope Sheaves.

We have at your command Engineers who have had years of experience in designing and installing satisfactory Rope Driving Equipments, whom we will be glad to have plan drives to meet conditions as they may exist.

SEE OUR ADVTS. IN MECHANICAL ENGINEERING THE JOURNAL OF THE A.S.M.E.

Digitized by Google

BOUND BROOK OIL-LESS BEARING CO.

BOUND BROOK, NEW JERSEY

Specialists in the Manufacture of Oil-less Bushings for more than a Third of a Century

BANISHING THE COSTLY RESULTS OF NEGLECT:

The heavy toll exacted by neglected lubrication points out the need for a safeguard that will protect the remote and inaccessible bearing points of machinery against sudden wear and breakdown when grease cups are overlooked.

"Bound Brook" (graphite and bronze) and **"Nigrum"** (impregnated wood) Oil-less Bushings, while not designed in all cases to be used without the usual method of lubrication, are so constructed as to afford complete insurance against the serious results of neglect. They have a self-contained lubricant, *built into them* at the factory, and whether attended to or not they will continue to render service longer than any other type bushing.



Oil-less Bushings have been installed with gratifying results on motor cars, truck and tractor chasses, textile machinery, washing machinery, baking machinery, water filtration machinery, tobacco machinery, sand blast machinery, conveying machinery, pumps, trolley wheels, elevating machinery, gear cutting machinery, steam turbines—in fact, wherever bushings are used.

"Bound Brook" Oil-less Bushings are constructed of high-grade phosphor bronze just like any other good bushing. On their bearing surfaces there are cast symmetrical grooves or trenches, varying in design according to the purpose for which the bushings are to be used. By means of hydraulic pressure these grooves are packed solid with a special hard lubricating graphite. The graphite and bronze surfaces are flush; they wear evenly; they require no refilling.

"Nigrum" Impregnated Wood Oil-less Bushings are made of hard, seasoned wood which is thoroughly impregnated with a specially prepared lubricating compound that never gives out. This is attained by a patented process resulting from years of study and experimentation.



There is no machinery of any kind that will not be more fully insured against trouble by the use of **"Bound Brook"** or **"Nigrum"** Oil-less Bushings.

Bound Brook Engineers will gladly study your lubrication problems and point out a method for their solution.

Digitized by Google

THE BUNTING BRASS & BRONZE CO.

720 SPENCER ST., TOLEDO, OHIO

722 So. Mich. Blvd., Chicago | Grand Central Palace, New York | 1362 E. 6th St., Cleveland | 198 Second St., San Francisco

Manufacturers of Bronze Bushings, Bronze and Babbitt-Lined Bearings (Patented)



REGISTERED B. B. & B. CO.

The products of this company appear in automobiles, trucks, tractors, power boats, motors, engines and general machinery lines.

"IN STOCK" BUSHINGS:



The standardization of all straight dimension bronze bushings in usual use has been successfully approached by this company, and has resulted in widespread benefits to all classes of trade.

These "In Stock" Bushings include 147 different sizes ranging from 5/8 to 2 1/4 inches inside diameters and from 3/4 to 5 inches in length. All are made from genuine Bunting Phosphor Bronze and are completely finished ready for assembly. These "In Stock" sizes are made up in big production runs in advance of demand and generous quantities of all sizes are constantly and instantly available at the main plant at Toledo and at all branches.

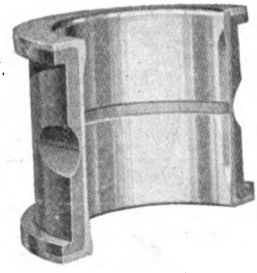
Prices are very much lower than the same bushings sold at previous to the development of the "In Stock" idea. All users can now purchase as needed in small quantities at long run prices. This system also makes replacement and service easy and economical on all machines and vehicles of which they are a part. Engineers generally are specifying these "In Stock" sizes wherever they can be used, and many are changing their specifications to conform to these standards. A card list of these "In Stock" sizes and oil holes and grooves available is furnished as a designer's and buyer's guide. Ask for Stock List "M."

SPECIALLY MADE BUSHINGS AND BEARINGS:



This company executes orders for bushings and bearings made to customers' dimensions and alloy specifications in lots of 50 and over. We make and list over 10,000 standard bushings and bearings and save our customers the costs of new patterns and tools. Bunting Bushings and Bearings universally cost less than the buyers' own costs for rough castings machined in their own plant, due to the specialization and economies that exist in this great plant devoted solely to one type of manufacture.

BABBITT-LINED BEARINGS:



Bunting Babbitt-Lined Bearings are possessed of certain superiorities, which are produced by exclusive methods and processes. The highest quality of Babbitt is so treated by exclusive processes developed within our own laboratories as to give a uniformity of structure that permits this great anti-friction metal to perform its work with maximum efficiency. The amalgamation of the babbitt with the bronze back is rendered perfect by processes developed exclusively within this plant. 337

CORED BARS:

Cored Bars of genuine Bunting Phosphor Bronze are supplied from the factory and all branches where stocks are constantly available to the trade. The qualities of this famous material give a perfect structure for machining.

GENERAL INFORMATION:

Bunting Bronze Bushings and Bearings offer a hard and long wearing bearing surface obtained by exclusive treatment protected by our own patents. To illustrate—a scleroscope reading on the bore of the average Bunting Bushing will be 30 as against 18 for the rank and file of other makes. All bushings and bearings are accurately and finely finished, ready for assembly. The quality and character of the Bunting product is the recognized standard in the trade.

This company maintains its own finely equipped laboratories where all metals are checked and all processes scientifically controlled. At present, this company has on file 107 alloy compositions. Alloy specifications are met with absolute and scientific accuracy.

We work from blue prints, accurate dimensions or correct samples—prints preferred.

Quotations and counsel on request. Also Stock List "M" which should hang in every engineer's office.



Digitized by Google

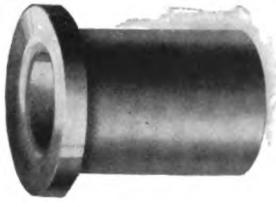
JOHNSON BRONZE COMPANY

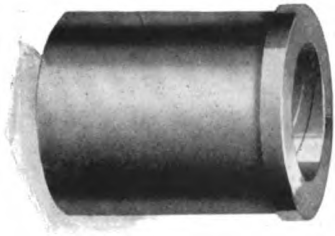
NEW CASTLE, PA.

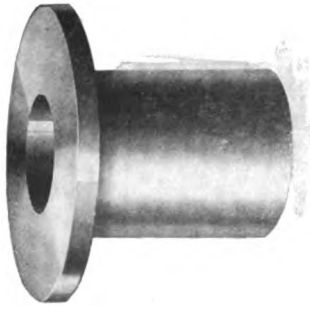
SALES OFFICES: New York, Pittsburgh, Detroit, Chicago
EXPORT OFFICES: J. E. Dockendorff & Co., 20 Broad St., New York City
The Parker Company, 165 Broadway, New York City
England, France, Italy, Japan, Switzerland, Spain, Holland and Belgium
Scandinavian Countries: Norway, Sweden and Denmark

Manufacturer of Bronze Bushings, Babbitt Lined Bearings, Automotive, Tractor, Car and Locomotive-Mill Bronzes

AUTOMOBILE BUSHINGS:







We carry in stock large quantities of standard automotive bushings and are, therefore, prepared at all times to give your requirements—whether large or small—prompt attention and service.

As we are at the present time serving a great many of the largest automobile manufacturers, a large part of our plant is devoted entirely to this particular type of bushing—we will be glad to quote on your requirements.

TRACTOR BUSHINGS:



We are prepared to furnish this type of bushing in any quantity, machined or rough. These bushings used in the assembly of tractors and adopted as the standard by many of the leading manufacturers, are noted for their high compressive strength.

They are especially made to withstand the uneven strains and severe shocks of the open fields. Our best attention and service will be given to your inquiries—send us your blue prints for trial order.

BABBITT LINED BEARINGS:



Babbitt Lined Bearings have been found invaluable to those manufacturers who required an unusually high speed bearing—one that will resist friction for a longer period and give greater uninterrupted performance than is expected of the ordinary bearing. To this class of manufacturers Johnson Babbitt Lined Bearings are giving unusual service day in and day out.

Send us your blue prints and specifications. We know that we can give you better service, a better product, dependable deliveries and perhaps better prices. Why not write us today?

Digitized by Google

THE METALINE COMPANY

WEST AVE. NEAR BORDEN, LONG ISLAND CITY, N. Y.

Sole Manufacturers of "METALINE" and Metalined or Oilless Bearings

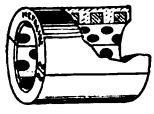
[Trade] "METALINE" [Mark]

(Registered in United States Patent Office, Act of Congress approved Feb. 20, 1905)

Metaline is composed of metallic oxides and other substances reduced to an impalpable powder and then solidified in hardened steel moulds under great pressure into short length plugs $\frac{3}{16}$ in., $\frac{1}{4}$ in. and $\frac{5}{16}$ in. in diameter.



Flanged Bushing for loose pulleys or for boxes having an end or collar bearing



Plain Bushing for boxes or pulley block sheaves where there is no end bearing

These plugs are inserted into holes drilled in divided bushings of gun metal bronze, phosphor bronze, or composition metal of good quality.

The two halves of the bushing having been soldered together and then machined all over to specified finished dimensions, are separated and holes drilled into the bearing surface—not all the way through the wall of the bushing—into which the Metaline plugs are tightly fitted and then filed flush with the bearing surface, care being taken to see that the spacing of the plugs is such that they will overlap or break joints, particularly along the line of motion.

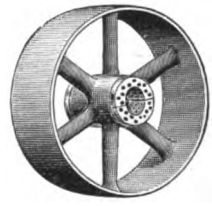
Bearings fitted with plugs of Metaline as described above are self-lubricating, being positively oilless; indeed no oil or other lubricant should be used.



Sheave fitted with plain or unflanged metalined bushing

It has been proved that they last for many years, and, if the Metaline plugs are renewed before over-much wear of the bearing surface has taken place, the life of the bushing or bearing will be very greatly prolonged.

Cleanliness is a very desirable feature, which, with the elimination of the danger of fire (a risk attending the use of fluid or semi-fluid lubricants in the other types of bearings) should particularly commend the use of Metaline.



Loose pulley after being fitted with a set of two metalined flanged bushings

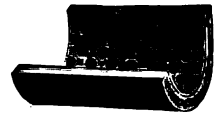
It is conceded by the manufacturers that Metalined bearings are not suitable for some lines of service; but it is claimed that these bearings give unusual satisfaction for:

Tackle Blocks
Wire Rope and Tramway Sheaves
Loose Pulleys
Friction Clutch Pulleys
Idler and Mule Pulleys
Elevator Pulleys

and other places where the bearing revolves around the shaft; line and countershaft boxes, floor stand boxes, ventilating fans, etc.



One-half flanged bushing



One-half plain bushing

Oilless bearings are indisputably a weighty sales argument in favor of some products because of the inconvenience of oiling, or the proximity to, or use of the product with materials that would be disfigured by oil spots.

We would be pleased to co-operate with you in the design and application of Metaline Bearings to your product or in your plant.

Write for catalog and additional information.

Digitized by Google

AUBURN BALL BEARING COMPANY

Established 1893

22 ELIZABETH STREET, ROCHESTER, N. Y.

Manufacturers and Engineers **Ball Bearings for Every Service**

AUBURN FOUR POINT CONE CONTACT BALL THRUST BEARINGS:



Enclosed T-100 Self-Contained Style Single Thrust for Use where Protection from Dust and Dirt is Desired

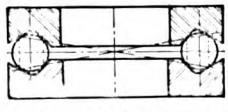
Each ball contacts constantly with both an inner (shorter) and an outer (longer) track on each race, yet it slides on neither of the four tracks, but rolls as freely as in a straight line across a table, and thus practically without friction. Made in sizes from 1⅛" to 26" outside diameter, a partial list of which is given below.

340

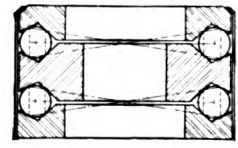
We design and make special ball thrust bearings for unusual conditions of service when bearings of regular size or design are not entirely suitable. Send particulars of your problems.



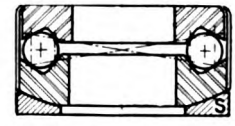
Open T-114 Self-Contained Style Single Thrust for Use where a Circulation of Oil is Desired



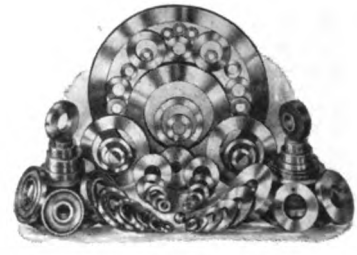
Open T-101 Style, "Maximum Capacity in Minimum Space" Single Thrust



Enclosed T-150 Style Self-Contained Double Thrust



Enclosed T-170 Style Spherical Seated Single Thrust



COLLARS AND RACES

of tool steel made to customers' specifications.



VALVE BALLS

Solid and Hollow, of Brass, Bronze and other metals from ⅛ inch diameter up.



STEEL BALLS

of alloy and carbon tool steel from 1/32 inch diameter up.

Style T-100 Sizes

Size No.	Bore Inches	Out. Diam. Inches	Thickness Inches	Balls Size No.
3	¾	1½	11/64	¼—13
8	1	2	11/64	5/16—15
13	1¼	2 7/16	11/64	5/16—16
22	1½	2 13/16	11/64	3/8—17
37	1 13/16	3¼	1 7/16	½—16
42	2½	4	1¼	½—20
44	3	4 5/8	1½	5/8—19
47	3 7/16	5	1	¾—30
*54	5	7	1¼	½—37
*55	6	8	1¾	11/64—32

Style T-114 Sizes

Size No.	Inches Bore	Out. Diam. Inches	Thickness Inches	Balls Size No.
5	1 11/16	3 7/16	1 5/16	½—16
6	1 11/16	3¾	1¼	5/16—17
7	2 7/16	4	1½	5/16—16
8	2 7/16	4½	1 5/16	11/64—16
9	2 11/16	4¾	1¾	¾—16
10	2 11/16	5 1/16	1¾	¾—17
11	3 7/16	5½	1¾	¾—18
12	3 7/16	5¾	1 7/16	11/64—18
14	3 11/16	6½	2	7/16—19
18	4 11/16	8½	2 5/16	1 1/16—18

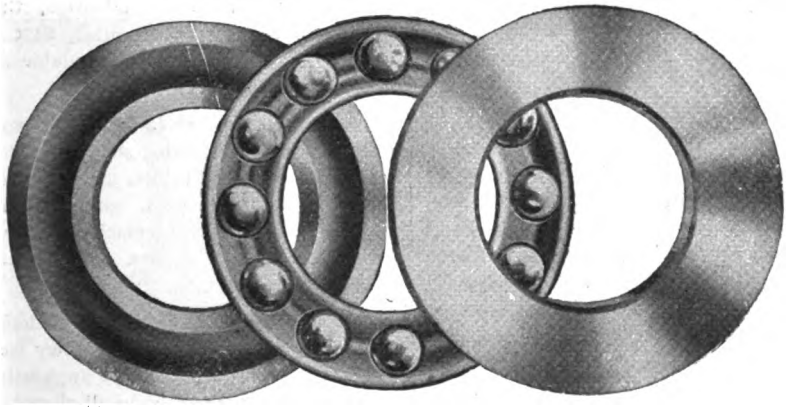
Digitized by Google

THE BEARINGS COMPANY OF AMERICA

LANCASTER, PENNA.

WESTERN SALES OFFICE
1012 FORD BUILDING, DETROIT, MICH.

Manufacturers of Thrust Ball Bearings, "Star" Ball Retainers



Manufacturers of

"STAR" BALL RETAINERS

for

Thrust

Magneto

Cup and Cone

Types of Bearings

Complete

THRUST BALL BEARINGS

made

to your requirements

LOAD AND DATA SHEETS:

341

For the use of engineers in laying out bearings we have compiled a set of data sheets showing various sizes of Ball Retainers we manufacture for **Cup and Cone, Thrust** and **Open Side Radial** type bearings.

We will gladly send these data sheets to any engineer requesting them.

We manufacture thrust bearings to your blue prints; also to interchange with other makes of thrust ball bearings.

Send us blue print of bearing desired, showing how it is to be mounted. Give us the quantity of bearings wanted and we will be pleased to quote you accordingly.

Digitized by Google

HYATT ROLLER BEARING CO.

NEW YORK, N. Y.

Manufacturers of Bearings for Mine Cars, Countershafts, Industrial Cars, Trucks of all kinds, Cranes, Trolleys and Hoists, Steel Mill Equipment, Concrete Mixers, Textile Machinery, Conveyors, Machine Tools and Line Shafting

The rapidly growing use of anti-friction bearings in all classes of machinery to conserve power, to cut down lubrication and attention costs and to insure dependability of operation, is a matter of especial interest to every engineer.

Eventually anti-friction bearings will entirely displace plain friction bearings as succeeding years increase the demand for more economical, more dependable operation of machinery. The gigantic wastes that have existed in our country due to its abundance of fuels and materials are being slowly but surely checked and anti-friction bearings are one of the soundest means of eliminating these wastes.

342



HYATT ROLLER BEARINGS:

Are anti-friction bearings that merit the careful consideration of every thinking engineer, because they are designed and constructed according to sound engineering principles.

By reason of the slight flexibility of the roller, Hyatt Bearings carry the load on an area. This materially reduces the unit load and enables the surfaces of the shaft and the bearing to stand up under shock loads without permanent deformation.

The chrome-vanadium steel rollers are heat-treated to a hardness that successfully resists wear. Assembled in a correctly designed, substantial cage, they provide an anti-friction unit that is simple to apply and that is dependable and effective.

Hyatt Roller Bearings have been used for years with unvarying success in steel mill cars and roller tables, machine tools of all kinds, mine cars, conveyors, industrial trucks, textile machinery, railway service cars, cranes, trolleys and hoists, automobiles, tractors, etc.

You will find our Engineering Bulletins of interest and value to you. They contain complete designs for the application of Hyatt Roller Bearings to all classes of machines. We shall be glad to send you Bulletins covering the applications in which you are interested.



HYATT LINE SHAFT BOX:

Hyatt Roller Bearing Line Shaft Boxes can be applied to any of these types of hanger frames:

1. 4 Point Set Screw Frame.
2. Pioneer Steel Frame.
3. Universal Giant (U. G.) Frame.
4. Ball and Socket (B. & S.) Frame.
5. J-Type Frame.

The Hyatt Box is split in two sections throughout. No elaborate change-overs are necessary to install the Boxes. Simply take out the old babbitted box and put in the Hyatt Box.

Digitized by Google

HYATT ROLLER BEARING CO. NEW YORK, N. Y.

HYATT ROLLER BEARING HANGERS:

The widespread need for increased efficiency in production has caused more attention to be paid to the power savings made possible by reducing the friction of moving parts of machinery. The perfection of antifriction bearings has eliminated a large percentage of the power waste caused by ordinary friction bearings.



Hyatt Line Shaft Box Mounted in a Standard 4-Point Set Screw Hanger

The true rolling motion of the **HYATT ROLLER BEARING HANGERS** eliminates at least 50% of the friction that exists in plain babbitted bearings, making possible a reduction of 15% of the total power. By the use of **HYATT ROLLER BEARING HANGERS,** therefore, you can either increase your present equipment without enlarging your power plant or you can effect a 15% reduction in your power bill—a saving of special importance at this time.

HYATT ROLLER BEARING HANGERS are made for all standard sizes of shafting and being split can be slipped into position without removing pulleys, couplings or frames. The boxes are filled with oil after which they need not be lubricated for another four months.

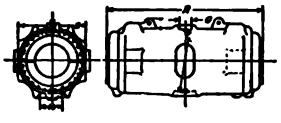
The bearing itself consists of a series of flexible rollers of chrome vanadium steel, retained in position by a substantial steel cage. Being hollow and having helical openings throughout their length, the rollers continually cover all bearing surfaces with oil.



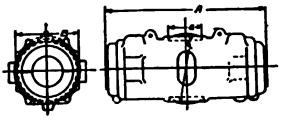
Hyatt Line Shaft Box Mounted in a Pioneer Steel Frame

HYATT ROLLER BEARING HANGERS are sturdily and accurately constructed and give satisfactory service year in and year out. There are many of them still in operation after 25 to 30 years of practical service—earning dividends through savings in power, oil and labor.

Install **HYATT ROLLER BEARINGS** in your present hangers and on all new Equipment Save power, oil and attention. Our Line Shaft Bulletin containing prices and sizes of boxes and hangers and engineering data will be of real value to you.



DIMENSIONS OF HYATT STANDARD BOXES



Either U. G. or B. & S. bearings may be used in Hyatt 4-point set-screw hangers and others with sufficient frame openings

Diam. of Shaft, Inches	Code	Approx. Weight, Lbs.	A		B		F		G		H
			BS	UG	BS	UG	BS	UG	BS	UG	UG
1 1/16	Babe	11	8 1/4	8 1/4	3 5/16	3 5/16	3 3/4	3 7/8	1 11/16	1 1/4	1 11/16
1 1/16	Back	14	9 1/4	9 1/4	3 5/8	3 5/8	3 7/8	4	1 11/16	1 1/4	1 11/16
1 1/16	Bade	22	10 1/2	10 1/2	4	4	4 1/2	4 7/8	2 1/2	1 3/4	2 1/16
2 1/16	Bail	27	11 1/2	11 1/2	4 1/4	4 1/4	4 7/8	5	2 1/2	1 3/4	2 1/16
2 1/16	Bald	38	13	13	5	5	5 5/8	5 3/4	3	1 3/4	2 1/16
2 1/16	Bang	46	14	14	5 3/8	5 3/8	5 7/8	6	3	1 3/4	2 1/16
2 1/16	Barb	60	15 1/4	15 1/4	5 7/8	5 7/8	6 1/2	6 1/2	3 1/2	2 1/4	2 1/16
3 1/16	Bass	67	16 1/2	16 1/2	6 1/2	6 3/8	6 1/2	6 3/4	3 1/2	2 1/4	2 1/16
3 1/16	Bath	110	17 1/4	17 1/4	7 1/4	7 1/4	7 1/4	7 3/4	3 3/4	2 1/4	2 1/16
3 1/16	Beak	182	19 1/2	...	8 1/4	...	10 1/2	...	4 5/8	...	...
3 1/16	Beef	230	20	20	8 3/4	8 1/2	10 1/2	9 5/8	4 5/8	2 7/8	3 1/16
4 1/16	Bege	280	22 1/4	22 1/4	9 1/2	8 5/8	10 1/2	10	5 1/2	2 3/4	3
4 1/16	Bell	330	24 1/2	...	10	...	10 1/2	...	6 3/8	...	...
5 1/16	Bend	380	24 3/4	...	10 3/4	...	12	...	6 7/8	...	...
5 1/16	Best	500	30	...	12	...	12 5/8	...	6 7/8	...	...

Digitized by Google

THE NEW DEPARTURE MFG. CO.

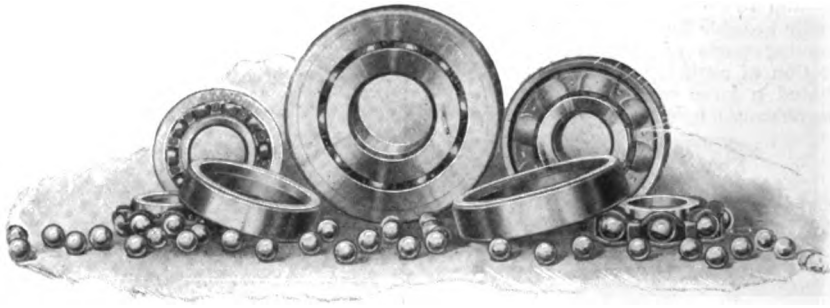
MAIN OFFICE AND WORKS, BRISTOL, CONN.

Plants at BRISTOL, HARTFORD AND MERIDEN, CONN.

Detroit Branch
3044 W. Grand Boulevard

Conrad Patent Licensee

Chicago Branch
122 So. Michigan Ave.



NEW DEPARTURE BALL BEARINGS:

New Departure ball bearings are manufactured in a New England factory where high standards of quality have been maintained for a quarter of a century and have given the manufacturers a favorable reputation throughout the world. The sincere aim of this Company has been and is to manufacture a ball bearing approaching as closely to absolute perfection as is humanly possible. In furtherance of this attainment, a highly specialized corps of laboratorial and mechanical engineers is employed, special machinery, exclusive processes and methods have been devised, and an inspection and testing system is in operation that is more exacting in its requirements of quality than found in almost any other industry under the sun.

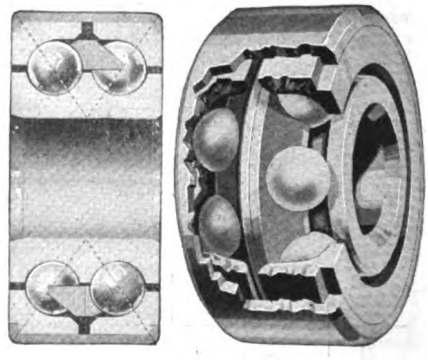
Ultra-severe endurance tests are kept continually running under conditions far beyond that required of bearings in actual service and by such is the final criterion of ultimate service determined and upheld.

The quality of New Departure bearings is further assured by the use of special chrome alloy steel, subjected to an ultra refined heat treatment, to further refine an already fine structure.

The development of New Departure Plants for the production of ball bearings has, within the last decade, been a most rapid and healthy growth, until, at the present time, it has become the largest ball bearing manufactory in the entire world.

Double Row Type:

This bearing is the most successful two-purpose ball bearing available. The design of the bearing and the angular contact of the two rows of balls with the raceways render this bearing **equally efficient in carrying radial loads or resisting thrust stresses from whatever direction they may come, singly or in combination.** The separator is so designed that each row of balls travels independently within its own spacing member, pockets of which are filled with lubricant, each ball rolling friction free in a film of oil. Except in those few places where only strictly radial loads and stresses occur, this bearing offers important advantages. It can be used successfully to replace combinations of single row and thrust bearings, simplifying designing, machining, assembly, and economizing installation cost.



Cross Section

Cut Open View

Another distinctive advantage is that it offers permanently correct, non-adjustable assembly and avoids danger of misalignment of separate members which is apt to occur when two or more separate bearings are used to do the same work. This bearing is made to standard sizes of bore and diameter, but not of widths.

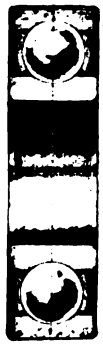
Descriptive and dimensional tables with prices upon application.

Digitized by Google

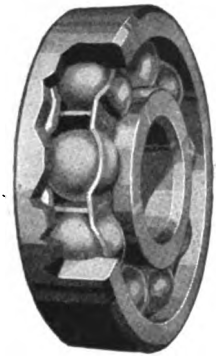
THE NEW DEPARTURE MFG. CO. BRISTOL, CONN.

Single Row Type:

A high quality ball bearing combining best materials, workmanship, and precision of dimension with correct design for withstanding radial loads imposed,



Cross Section



Cut Open View

without friction. The largest size and number of balls possible for a given bearing are used and the ball spacer is so designed that the balls perform their work with practically no rubbing against the sides of their pockets. This bearing is made to internationally standardized dimensions.

The cup and cone are made of electric furnace high carbon chrome alloy steel, with an accurately generated curvilinear raceway and regularly finished to limits standardized by the Society of Automotive Engineers.

Magneto Type:

A ball bearing that most truly is built like a watch, small in size, exquisite in the precision of its every part and detail, and so designed as to be specially adaptable to noiseless running at high speeds.



Cut Open View
Magneto Type

Descriptive and dimensional tables with price list sent upon application.

Radax Type:

This bearing is capable of carrying radial loads and taking one-direction thrust stresses. The point of contact of balls and races is at 11 degrees, thus making the radial and thrust capacities practically equal. The cup and cone are separable but the use of a retaining spring in the cup permits the handling or the housing of the bearing as a unit. The separator simulates the perfected single row type which allows maximum number of balls to the bearing. The same standards of quality that are applied to the manufacture, inspection and test of the two bearings named above, obtain in this product also.



Cross Section
Radax Type



Cut Open View
Radax Type

To assist designers in the selection and proper mounting of New Departure Ball Bearings in any mechanism, our Engineering Department issues an Engineering Catalog in loose-leaf form, containing over a hundred applications to various types of machinery. New sheets are added monthly. This catalog and the supplementary bulletin service are offered to all engineers, designers and builders of machinery who request it on their letterhead.

Digitized by Google

ROYERSFORD FOUNDRY AND MACHINE CO.

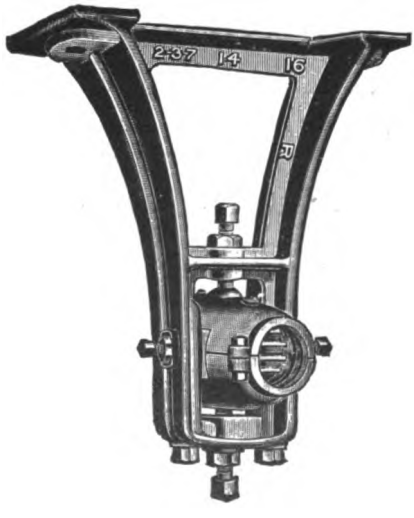
52 N. 5TH ST., PHILADELPHIA, PA.

Manufacturers of Roller Bearings and Other Power Transmission Machinery

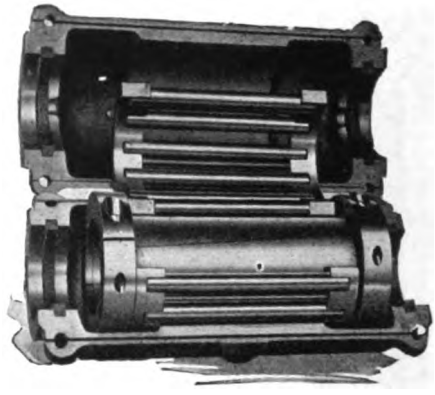
"SELLS" ROLLER BEARINGS:

"Sells" Roller Bearings instantly fit ***all*** hangers, post hangers and pillow blocks of corresponding size. They are split throughout. Their installation is an overnight job—no interference with production. They are made with single and double roller structure—the latter for heavy bearing duty.

An important feature of "Sells" Roller Bearings is the split steel sleeve that fits over the shaft and protects it from the hard rollers. This sleeve is clamped to the shift by means of split collars. The rollers themselves are carbonized, hardened and ground outside and have soft resilient centers.



The "Sells" Roller Bearing Drop Hanger



Single Roller Structure "Sells" Roller Bearings

The rollers are retained snugly in the roller structure, and are held always parallel to the shaft. There can be no roller-against-roller friction. All end thrust is absorbed.

Some of the largest concerns in the country have adopted "Sells" Roller Bearings. We have letters from many of these, giving the savings in power effected through the use of "Sells" Roller Bearings. This saving ranges from 10% to 30%. Ten percent saving is always guaranteed. Let us send you a few of these letters.

Let us also send a catalog on anti-friction power transmission.

Digitized by Google

ROYERSFORD FOUNDRY AND MACHINE CO., PHILA., PA.



ROLLERINE:

Compounded expressly for the lubrication of "Sells" Roller Bearings and other roller and ball bearings. "Rollerine" contains no wax, talc, soapstone, resin, resin oil or any other gum of high frictional properties. When used to lubricate "Sells" Bearings, "Rollerine" gives maximum efficiency.

Write for free sample.



"Sells" Oil-and-Grease Gun

THE "SELLS" OIL-AND-GREASE GUN affords the most efficient means for applying "Rollerine" to "Sells" Roller Bearings. It is also adapted for heavy oils and greases of all kinds.

The hand wheel operating a pinion meshing in the rack makes it easy to control the amount of lubricant forced out. Its economy is very apparent. A curved nozzle adds to the convenience in applying the lubricant.

"SELLS" ROLLER BEARING BOXES
with Single Roller Structures for Line Shafts

Size of shaft, inches	Price	Length of box, inches	Width of box, inches	Height of box, inches
*Ibex 1 & 1	$6.00	6⅜	2	2¾
Ice 1 & 1¼	7.00	6	3	3
Idea 1 & 1½	8.00	7	3	3⅝
Idiot 1 & 1¾	9.50	8	3¾	4
Idol 1 & 2	11.00	8⅜	3	4¼
Ignite 2 & 2¼	13.50	9¾	4½	5⅛
Ilk 2 & 2½	15.50	10¼	4¾	5⅜
Image 2 & 2¾	19.00	10⅝	5⅜	6¼
Imbibe 2 & 3	22.50	11	5½	6¼
Immerse 3 & 3¼	34.50	11⅞	6	6⅝
Impose 3 & 3½	38.50	12⅜	6	6
Imposter 3 & 3¾	67.00	14	6	7⅜
Improve 3 & 4	77.00	15	7½	7½
Inapt 4 & 4¼	88.00	15	7⅞	8⅝
Inca 4 & 4½	100.00	16⅛	8	8⅜
Incense 4 & 4¾	113.00	16½	8½	9⅜
Income 4 & 5	128.00	17	8	9⅜

HEAVY DUTY "SELLS" ROLLER BEARING BOXES
with Double Roller Structures for Main or Jack Shafts and Heavy Belt Pulls

Size of shaft, inches	Price	Length of box, inches	Width of box, inches	Height of box, inches
*Impound 1 & 2	$19.00	13	3	4⅝
Imprint 2 & 2¼	23.50	13¾	4½	5
Inarch 2 & 2½	26.50	14⅜	4¾	5
Inborn 2 & 2¾	32.50	15¼	5¼	6⅛
Inbred 2 & 3	39.00	17⅞	5½	6
Inclose 3 & 3¼	59.00	17	5	6¾
Incog 3 & 3½	66.00	17¾	6	6¾
Indeed 3 & 3¾	94.00	19¼	6	7
Indent 3 & 4	110.00	19¾	7⅛	8
Index 4 & 4¼	126.00	21	7⅞	8⅝
Indigo 4 & 4½	140.00	21¾	8	9
Induce 4 & 4¾	161.00	22⅜	8½	8⅞
Infant 4 & 5	179.00	24	8	9⅜
Increase 5 & 5½	230.00	24¾	9½	10½
Incrout 5 & 6	316.00	26½	10⅜	11½

*These words are code words and refer to box taking size of shaft above which they are placed.

Digitized by Google

S K F INDUSTRIES, INC.

165 BROADWAY, NEW YORK CITY

OFFICES OF DISTRICT REPRESENTATIVES

BOSTON
BUFFALO
PHILADELPHIA
CLEVELAND
DETROIT
ATLANTA
CINCINNATI
NEW HAVEN
SAN FRANCISCO
CHICAGO

Supervising at the Request of the Stockholders, the Hess-Bright Mfg. Co., S K F Ball Bearing Co., Atlas Ball Co., Hubbard Machine Co., S K F Research Laboratory

SERVICE ASSURANCE:

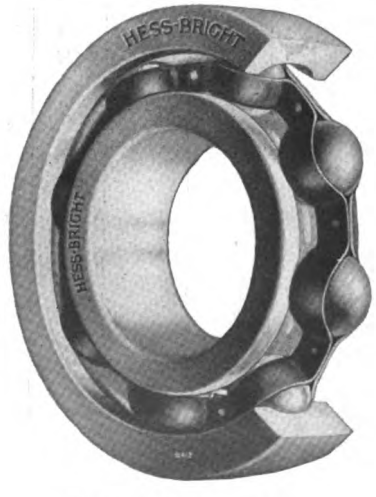
S K F is linked with a world-wide reputation for delivering satisfactory service, and to an investment too large to be jeopardized by non-performance of anything with which it is connected.

Therefore, S K F provides a supervision of factories throughout the world and an international organization for scientific research in engineering, manufacturing and merchandising to assure the user a full measure of performance in products endorsed with the mark S K F.

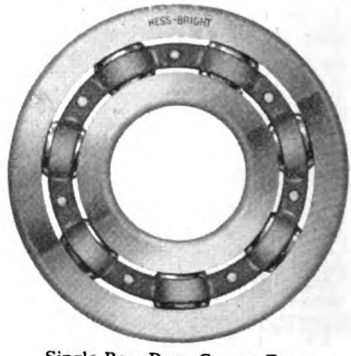
The S K F Industries, Inc., have developed the use of ball bearings as a means of increasing the efficiency of machinery and bettering manufacturing methods. The S K F mark is an endorsement of a high class product. Back of the product is a technical organization which ensures engineering cooperation of a practical character. To make this service still more concrete the S K F Industries, maintain a laboratory equipped with the best scientific instruments and most exact modern machinery. The purpose of this is to study friction problems, investigate or develop apparatus designed to eliminate friction and to assist customers in the selection of suitable bearings for individual applications.

American manufacturers are invited to avail themselves of this bearing service at any time.

Among the products now endorsed with the S K F mark are the S K F marked single row deep groove radial bearings, S K F marked self-aligning radial and thrust bearings and Atlas chrome alloy steel balls.



Sectional View Single Row
Deep Groove Type Ball Bearing



Single Row Deep Groove Type
Radial Ball Bearing

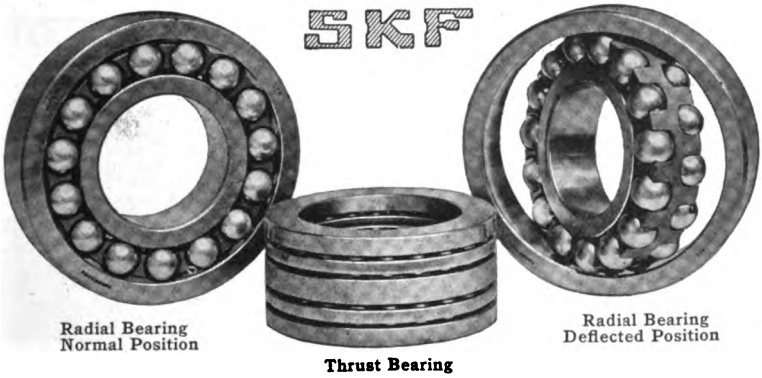
SINGLE ROW DEEP GROOVE BALL BEARINGS:

S K F Marked Single Row Radial Bearings are made under the Conrad patent. They are characterized by an uninterrupted deep groove type of construction, which gives them exceptional load carrying capacities in heavy service accompanied by shocks and considerable thrust load. The heavy rings of continuous uniform cross-section are susceptible of extreme accuracy in manufacturing and maintained accuracy in service. As the cross-section of the raceway is approximately U-shaped, the raceway possesses great power of resistance against any possible distortion caused by the balls supporting the load.

Deep grooves produce the maximum possible carrying capacity of balls and raceways without the increase of internal friction.

Digitized by Google

S K F INDUSTRIES, INC. NEW YORK, N. Y.



Thrust Bearing

The depth of grooves together with the uninterrupted raceways permit this type of bearing to accept thrust loads amounting to a high percentage of the radial capacity.

The design, method of assembly, and quality of material and workmanship employed have produced a bearing of the highest quality as proved by the many successful applications.

S K F Marked Double Row Self-Aligning Ball Bearings possess the exclusive feature of self-alignment within the bearing itself so that regardless of whether the shaft is deflected or is out of alignment it turns freely.

Two rows of balls, with the radial load always equally distributed on both rows under all conditions of service, make it possible to fully utilize the large number of balls employed. The cross-section of the outer raceway is such that the balls are supported at the heaviest section of the ring.

S K F Marked Thrust Bearings are made in a single or double thrust type. Either may be provided with flat seat or aligning seat and washer. They are employed wherever heavy and continuous thrust loads must be supported and can under no circumstances be used to sustain radial loads.

The rolling friction of the S K F marked type is at a minimum. The friction is less than in any other type of bearing under all speed and load conditions. This is of particular importance in high speed applications.

An exclusive S K F marked type is the self-contained, self-aligning double thrust bearing. Since the design of this bearing is such that the parts adjust themselves freely to any degree of misalignment occurring under operating conditions, the load is always distributed equally over all the balls.

Mounting is made simple since there is only one part to handle. The accurate and costly machining required is also greatly reduced and in case of disassembly the bearing can be readily reassembled without danger of disturbing the original adjustment of the parts.



S K F Marked Shaft Hanger

S K F Marked Power Transmission Equipment consists of the self-aligning adapter bearing with hanger for supporting the shafting. The adapter bearing has the

(Continued on next page)

Digitized by Google

(Continued from preceding pages)

S K F INDUSTRIES, INC. **NEW YORK, N. Y.**



Carton in Which Atlas Steel Balls are Packed and Sealed

same desirable features as possessed by the S K F marked radial bearing. To mount it no machining of the shaft is necessary. The bore of the inner race is tapered and fits on a conical split sleeve. This sleeve is simply slipped over the shaft; the bearing is drawn in place on it and a lock nut holds the bearing firmly in position on the shaft. The bearing adapts itself to shaft deflections and misalignment and allows the shaft to turn freely without binding strains or cramping the balls.

ATLAS STEEL BALLS:



TRADE MARK

Atlas Balls are manufactured under the most rigid standards and by the best process of known manufacture. Extreme care is used in selecting the material for the balls. The steel must be of uniform composition, structure and toughness. It must be free from imperfections and be susceptible to highly developed methods of heat treatment.

Skilled workmanship and a high degree of accuracy are maintained at all times. Thorough and careful inspection after every operation in the process of manufacture maintains the specified standards and eliminates all defective material.

The necessity for this care and precision in manufacture is not generally appreciated. The limits of tolerance are much smaller than are generally considered feasible and the finish of the surface of the balls must be of the highest. Grinding or polishing marks that may be detected by the naked eye immediately condemn the ball. The higher the surface finish, the better the endurance of the ball. Apparently flawless ball surfaces show up under the microscope as fine scratches, pittings and even gash-like defects according to the care devoted to the final operations. Surface polish alone will not do as it is but the final touch applied to truly ground shapes.

The balls approach as nearly as possible true spheres. Moreover, the allowable variation from ball to ball in a given size is extremely small. Atlas balls are made as true as it is mechanically possible and commercially practicable to realize. They are guaranteed to be accurate and true to size both in diameter and sphericity to within the one ten-thousandth part of an inch.

SEE OUR ADVT. IN MECHANICAL ENGINEERING THE JOURNAL OF THE A.S.M.E.

Digitized by Google

THE NORMA COMPANY OF AMERICA

ANABLE AVE., LONG ISLAND CITY, NEW YORK, N. Y.

Telephone, Hunter Point 1616

"Norma" Ball, Roller, Thrust and Combination Bearings

"NORMA" BALL BEARINGS:



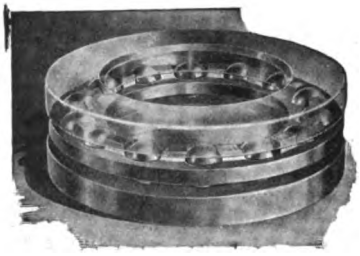
Open type, separable bearings of extremely high precision, rigidly mounted, silent running, with every element in workmanship and design contributing to high efficiency, long-time service; notably successful in high-speed operation, being the standard bearings with most of the leading manufacturers of high-speed electrical apparatus.

"NORMA" ROLLER BEARINGS:



Heavy-duty, high-efficiency bearings pre-eminently adapted for service where shock, jar, vibration and sudden load variations must be encountered; double the load capacity of a ball bearing of the same dimensions; temporary overload capacity up to 50 per cent of their own rating; high-speed, quiet-running units of extreme precision and maximum durability.

"NORMA" THRUST BEARINGS:



Precision units affording maximum anti-friction efficiency under end-thrust loads; designed to afford long-service durability and silent-running qualities: made in several styles, single and double, both without housings and with housings of several types giving self-contained advantages.

351

"NORMA" COMBINATION BEARINGS:



Self-contained units affording perfect adjustment and maximum anti-friction efficiency under combined radial and thrust load; two types—combined annular and ball thrust, and combined roller and ball thrust, distinguished by high precision, open-type construction, rigid mounting, silent running, and high-speed qualities.

SEE OUR ADVTS. IN MECHANICAL ENGINEERING THE JOURNAL OF THE A.S.M.E.

Send for our complete catalog, "Norma Precision Bearings."

Digitized by Google

THE TIMKEN ROLLER BEARING CO.

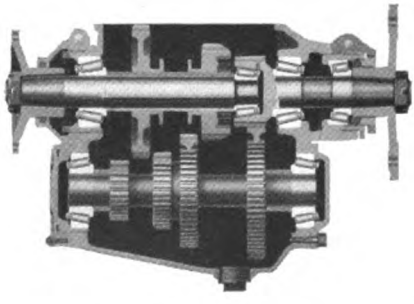
CANTON, OHIO

Plants manufacturing complete bearings at

CANTON, OHIO; COLUMBUS, OHIO; BIRMINGHAM, ENGLAND; PARIS, FRANCE
General Offices, Steel, Rolling and Tube Mills, CANTON, OHIO.

Timken Tapered Roller Bearings for Passenger Cars, Trucks, Trailers, Tractors, Farm Implements, Machinery, and Industrial Appliances

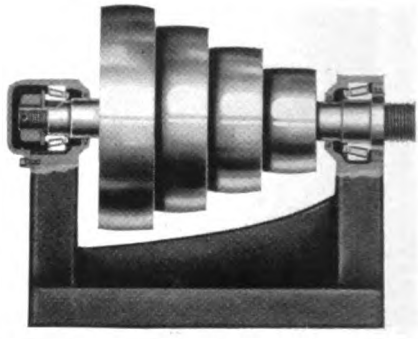
The design of Timken Tapered Roller Bearings is based on the cone, as contrasted with the sphere of ball bearings, and the cylinder of straight roller bearings. The bearing consists primarily of three working parts, an inner race or "cone," an outer race or "cup," and conical or tapered "rolls" which operate between the two races. The apexes of the conical surfaces of cone, cup and rolls coincide on the axis of the bearings, so that true rolling action is obtained. These parts, made of electric-furnace steel, hardened and ground accurately to size, and a one-piece pressed steel "cage" or retainer which spaces and aligns the rolls, complete the bearing.



SUPERIOR FEATURES OF TIMKEN BEARINGS ARE:

1. Ability to carry either thrust or radial load, or both in combination.

2. Perfect adjustability for wear. Looseness due to wear is readily taken up by advancing the inner race farther into the outer race or cup, or vice versa. In



practice provision is always made for making this adjustment in a simple and easy manner, by tightening a nut, or threaded carrier, or by removal of shims, etc.

3. Because of its superior design and careful manufacture, the Timken Bearing is pre-eminent for hard service, giving maximum satisfaction at minimum cost. In automotive vehicles Timken Bearings predominate in the applications where requirements are the most difficult. They are used in passenger cars, trucks, and tractors for mounting front and rear wheels, differentials, pinion and worm shafts, transmissions and fans.

4. Quality of material. The Timken Roller Bearing Company manufactures and fabricates its own steel for cups, cones, and rolls, and is, therefore, able to dictate exactly and obtain the proper qualities in the raw material to give the best results in the finished product.

Digitized by Google

THE TIMKEN ROLLER BEARING CO. CANTON, OHIO

Due to its careful design and manufacture, the Timken Bearing is pre-eminently a "hard service" bearing, and is used throughout automotive vehicles at the points of severest service, in front and rear wheels of passenger cars, trucks and tractors, and on differentials, pinion, and worm shafts, and in transmissions of the same vehicles.

The use of Timken Bearings is by no means limited to the automotive industries. They are recommended for use wherever service is hard, adjustment is necessary, and load is a combination of radial and thrust loads. The tapered roller bearing—the Timken type—is the type of bearing that will function properly under radial load, or thrust load, and all possible combinations of the two.



TIMKEN ENGINEERING SERVICE:

The Timken Roller Bearing Company realizes that bearings, if poorly chosen for the work or improperly mounted, are unsatisfactory to the user and damaging to the maker's reputation. Consequently every effort is made to aid Timken Bearing users to apply them to the greatest possible advantage. To this end, it is a fixed policy to sell bearings only for specific applications, after details of the mounting and loading have been checked and approved by the Timken Engineering Department. When necessary, drawings are furnished showing recommended construction for the use of Timken Bearings in the particular machine under consideration. Every user of Timken Bearings is, therefore, enabled to draw on the experience of the Timken Roller Bearing Company with applications of a nature similar to his own, and bearing selection is based on comparative data accumulated in the applying of 60 million bearings rather than on arbitrary load rating tables which can hardly be comprehensive enough to cover the many variable factors encountered.

This Timken engineering service is further extended to cover inspection of the mounting of bearings in the customer's production line. Trained "service inspectors" call at Timken customers' plants at regular intervals, instructing the workmen in the best methods of assembling and adjusting bearings in the work, and advising regarding lubrication, etc.

Timken service begins with the manufacture of the steel from which Timken Bearings are made. It continues throughout the construction of the bearings, so that high quality is attained in the finished product and is further amplified in the engineering help freely given in choosing bearings and methods for mounting them.

Digitized by Google

STANDARD STEEL AND BEARINGS

INCORPORATED

Philadelphia — Standard Roller Bearing Co.
Plainville, Conn.
Pittsburgh — Braeburn Steel Co.

EXECUTIVE OFFICES: 366 MADISON AVENUE, NEW YORK CITY

Controlled and Operated by

MARLIN-ROCKWELL CORPORATION

Manufacturers of S. R. B. Maximum Silent Type Annular Ball Bearings (Single Row and Double Row), "Standard Chrome Alloy" Steel Balls, Rudge-Whitworth Detachable Wire Wheels

S. R. B. ANNULAR BALL BEARINGS:



It is a fact and has been proven by conclusive tests for strength and endurance that S. R. B. Bearings are superior to any bearings made in America. There are three fundamental principles upon which we base this claim of superiority, namely:

1st. Accuracy of chemical composition of the steel used in their manufacture.

2nd. Accuracy of heat treatment which produces the correct physical structure in the steel.

3rd. Accuracy of mechanical execution in the grinding and fitting of all the component parts.

We stand ready to prove these assertions.

S. R. B. Maximum Silent Type Annular Ball Bearings—Single Row—are so called because no other name is so appropriately descriptive; maximum, because they contain the greatest number of balls possible to put into a bearing of this type; silent, because they are positively noiseless.

They are capable of sustaining greater thrust loads than other annular ball bearings because of four specific points of merit in their design and workmanship:

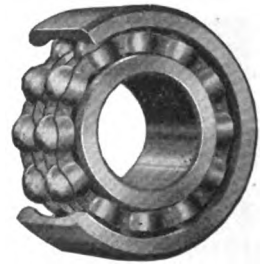
1st. Deep ball groove in races.

2nd. Large diameter balls.

3rd. Maximum number of balls.

4th. Accurate and compact fitting assembly.

S. R. B. Maximum Silent Type Annular Ball Bearings—Double Row—We also manufacture another type of annular ball bearing that combines the double function of a radial and thrust bearing; this is the S. R. B. Double Row Annular Bearing, which includes all the points of merit above mentioned and presents distinctive features, such as the one-piece cone and one-piece race, giving it a sturdiness not found in the usual type of double row annular bearing.



S. R. B. Bearings are interchangeable with all other makes of annular ball bearings, either domestic or foreign; comparative table showing the most commonly used sizes will be sent upon request.

Digitized by Google

U. S. BALL BEARING MFG. CO.

(Conrad Patent Licensee)

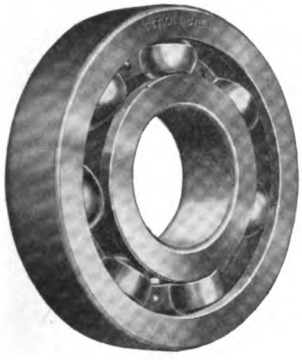
PALMER ST. AND KOLMAR AVE., CHICAGO, ILL.

Manufacturers of Strom Bearings

STROM BEARINGS

BALL BEARINGS:

Of all types and sizes to operate under any condition of load and speed.



STROM Radial Bearings:

Made in any size for light, medium or heavy duty; with deep groove ball races accurately formed, in which large sized balls, separated by a light and sturdy retainer, roll true with the least friction. They are especially adapted above all others to sustain large radial loads under severe operating conditons. They are capable of resisting end thrust loads equal to 40% of their available radial capacity in either direction.

STROM Angular Contact Bearings:

Made in the same sizes as the 200, 300 and 400 series radial bearings. They are of similar construction to the radial bearings, being especially designed to support combinations of radial and heavy end thrust loads acting in one direction. They have an end thrust capacity equal to 150% of their available radial capacity.



Double-acting self-aligning thrust bearing with leveling washers. 2100U Series

STROM Thrust Bearings:

Made in all types and sizes with flat or grooved races to meet all conditions of speed and thrust loads acting in one or two directions, and compensating for misalignment. They are of the same typical sturdy construction for which STROM bearings are noted and are especially adapted to sustain exceptionally heavy thrust loads.

Engineering Service:

Our Engineering Department comprises a staff of ball bearing experts, who are always at your service. It is our desire that if at any time they can be of service to you, and help you to solve your bearing problems, you will feel at liberty to call upon them.

Any of the following publications gladly furnished on request:

STROM BEARING S. A. E. Data Sheet. Catalog and price list.

Pamphlets (S. A. E. data sheet size).

Lubrication of Ball Bearings pamphlet.

Limits and Allowances on Shafts and Housings.

Calculating Bearing Loads.

Interchangeable Sizes of Strom Bearings.

SEE OUR ADVTR. IN MECHANICAL ENGINEERING THE JOURNAL OF THE A.S.M.E.

Digitized by Google

THE GWILLIAM COMPANY

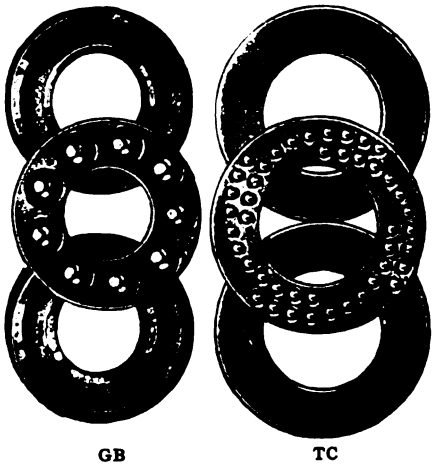
NEW YORK
253 West 58th St.

PHILADELPHIA
1314 Arch St.

BROOKLYN, N. Y.
23 Flatbush Ave.

Ball and Roller Bearings
Sole Licensed Manufacturers for the U. S. of the Bowden Wire Mechanism

THRUST BEARINGS:



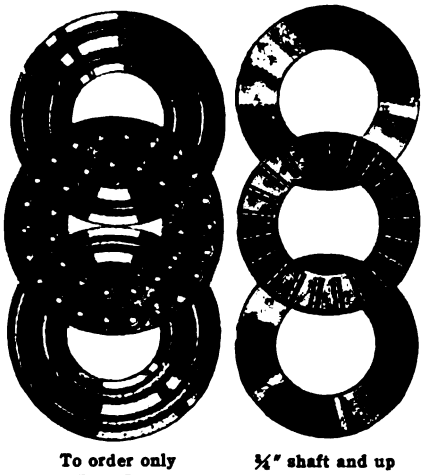
GB
Made in sizes
¼ inch shaft diameter up

TC
Made in sizes
⅜ inch up

Ball and Roller

Standard Dimensions or to order

Inch or Metric Sizes



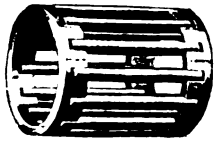
To order only
Two Row

¼" shaft and up
RTC

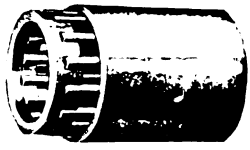
One Bearing or One Thousand

JOURNAL ROLLER BEARINGS:

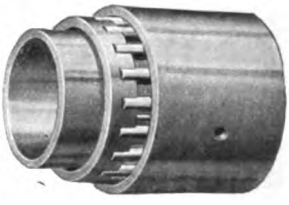
Roller Cage for Light Duty. Shaft and housing should be hard.



With outer Casing for Medium Duty.



With outer Casing and inner sleeve, hardened and ground. For Medium and Heavy Duty.



Made in sizes for ½ inch shaft and up

Rollers are **SOLID** High Carbon High Chrome Steel, Hardened and Ground.

Furnished in standard sizes or to your own specifications, with or without casings and sleeves.

SELF ALIGNING THRUST BEARINGS

Heavy Duty



Ball or Roller

Standard dimensions are for 1 inch shaft and up. Also made to order

Inch or Metric Sizes

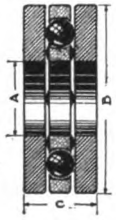
Digitized by Google

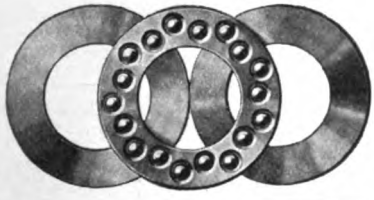
BALL THRUST BEARINGS:

Flat races

(Special Series)

One thrust cage with Balls and Two Hardened Steel Races

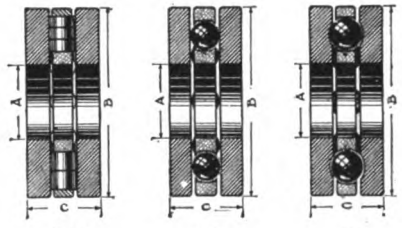




No.	Dimensions in Inches "A" Shaft Diameter	"B" Outside Diameter	"C" Width over All	Diameter of Balls
TC 125	⅜	⅞	⅜	11/16
TC 126	13/16	1 17/32	13/16	11/16
TC 127	7/16	29/32	1/4	3/32
TC 128	1/2	3/4	1/4	3/32
TC 129	1/4	7/16	3/32	3/32
TC 130	1/4	5/8	3/8	1/8
TC 131	1/4	21/32	1/4	1/8
TC 132	1/4	3/4	1/4	1/8
TC 133	1/4	11/16	3/8	1/8
TC 134	1/4	21/32	3/8	1/8
TC 135	1/4	5/8	1/4	3/32
TC 136	7/16	3/4	1/4	1/8
TC 137	7/16	21/32	3/8	1/8
TC 138	7/16	11/16	3/8	1/8
TC 139	7/16	1"	3/8	1/8
TC 140	7/16	1 3/32	1/2	1/16
TC 141	3/8	11/16	3/32	3/32
TC 142	3/8	3/4	3/32	1/8
TC 143	3/8	11/16	1/4	1/8
TC 144	3/8	1"	3/8	1/8
TC 145	3/8	1 3/32	1/2	1/16
TC 146	3/8	1 3/16	1/2	1/16
TC 147	11/32	11/16	1/4	1/8
TC 148	11/32	1"	3/32	1/8
TC 149	11/32	1 3/32	7/16	1/8
TC 150	7/16	3/4	3/32	3/32
TC 151	7/16	11/16	3/8	1/8
TC 152	7/16	1"	7/16	1/8
TC 153	7/16	1 1/16	3/8	1/8
TC 154	7/16	1 3/32	1/2	1/16
TC 155	1/2	7/8	3/8	1/8
TC 156	1/2	3/4	1/4	1/8
TC 157	1/2	1"	3/32	1/8
TC 158	1/2	1 1/16	3/8	1/8
TC 159	1/2	1 3/32	3/8	1/8
TC 160	5/8	1"	3/32	1/8
TC 161	5/8	1 3/32	3/32	1/8
TC 162	5/8	1 1/4	3/8	1/8
TC 163	3/4	1 3/32	3/32	1/8
TC 164	3/4	1 1/16	3/32	1/8
TC 165	11/32	1 11/32	5/16	3/16
TC 166	11/32	1 1/2	7/16	3/16
TC 167	7/8	1 1/2	3/8	1/8
TC 168	7/8	1 1/2	3/8	1/8
TC 169	7/8	1 5/8	3/8	1/4

ROLLER THRUST BEARINGS
BALL THRUST BEARINGS, FLAT RACES
BALL THRUST BEARINGS, GROOVE DRACES

(Standard Dimensions)



RTC TC GB

SYMBOLS

No.	Dimensions in Inches "A" Shaft Diameter	"B" Outside Diameter	"C" Total Width	Diameter of Rollers and Balls
5	¾	1 11/32	3/16	1/16
6	11/16	1 11/32	3/16	3/16
7	7/8	1 17/32	5/16	1/4
8	15/16	1 17/32	5/16	1/4
9	1	1 17/32	5/16	1/4
10	1 1/16	1 17/32	5/16	1/4
11	1 1/8	2 3/32	5/16	1/4
12	1 1/16	2 3/32	5/16	1/4
13	1 1/4	2 11/32	5/16	1/4
14	1 5/16	2 11/32	5/16	1/4
15	1 3/8	2 11/32	5/16	1/4
16	1 7/16	2 11/32	5/16	1/4
17	1 1/2	2 11/32	5/16	1/4
18	1 9/16	2 11/32	5/16	1/4
19	1 5/8	2 11/32	7/16	3/16
20	1 11/16	2 11/32	7/16	3/16
21	1 13/16	3 3/32	7/16	3/16
22	1 15/16	3 3/32	7/16	3/16
23	1 7/8	3 3/32	7/16	3/16
24	1 15/16	3 3/32	7/16	3/16
25	2	3 3/32	7/16	3/16
26	2 1/16	3 3/32	7/16	3/16
27	2 1/8	3 3/32	7/16	3/16
28	2 3/16	3 3/32	7/16	3/16
29	2 1/4	3 3/32	7/16	3/16
30	2 5/16	3 3/32	7/16	3/16
31	2 3/8	3 3/32	7/16	3/16
32	2 7/16	3 3/32	7/16	3/16
33	2 1/2	3 3/32	7/16	3/16
34	2 9/16	3 3/32	7/16	3/16
35	2 5/8	4 11/32	1	3/8
36	2 11/16	4 11/32	1	3/8
37	2 3/4	4 11/32	1	3/8
38	2 13/16	4 11/32	1	3/8
39	2 7/8	4 11/32	7/8	3/8
40	2 7/8	4 11/32	1	3/8
41	2 15/16	4 11/32	1	3/8
42	3	4 11/32	1	3/8
43	3 1/16	4 11/32	1	3/8
44	3 1/4	4 11/32	1	3/8
45	3 1/2	5 11/32	1	3/8

Balls same diameter as rollers in above list

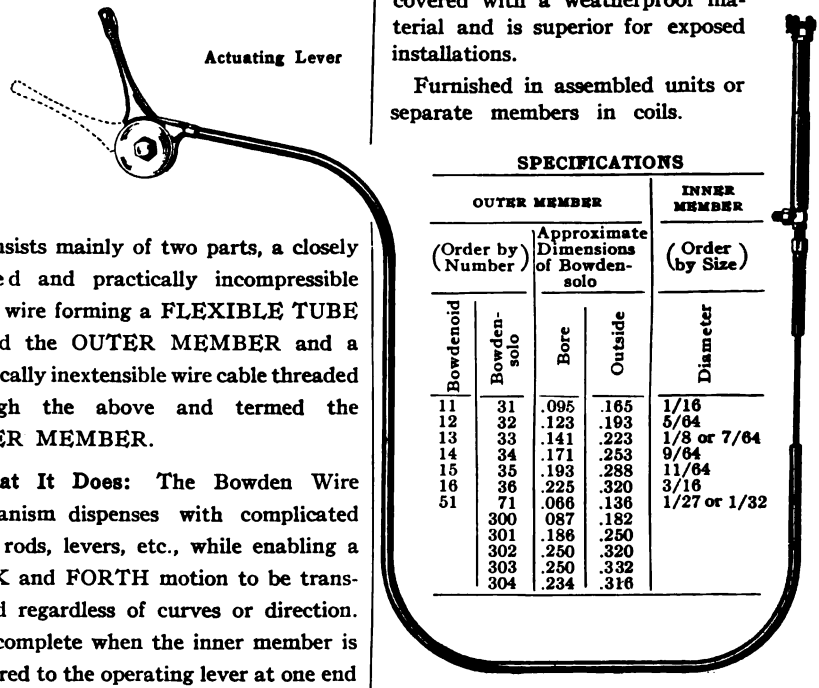
(Continued on next page)

Digitized by Google

(Continued from preceding pages)

THE GWILLIAM COMPANY BROOKLYN, N. Y.

BOWDEN WIRE MECHANISM:



Consists mainly of two parts, a closely coiled and practically incompressible spiral wire forming a FLEXIBLE TUBE termed the OUTER MEMBER and a practically inextensible wire cable threaded through the above and termed the INNER MEMBER.

What It Does: The Bowden Wire Mechanism dispenses with complicated angle rods, levers, etc., while enabling a BACK and FORTH motion to be transmitted regardless of curves or direction. It is complete when the inner member is anchored to the operating lever at one end and to the object to be moved at the other.



Bowdensolo



Bowdenoid

There are two styles of finish: BOWDENSOLO, in which the outer member is tinned.

BOWDENOID is of the same construction but is in addition covered with a weatherproof material and is superior for exposed installations.

Furnished in assembled units or separate members in coils.

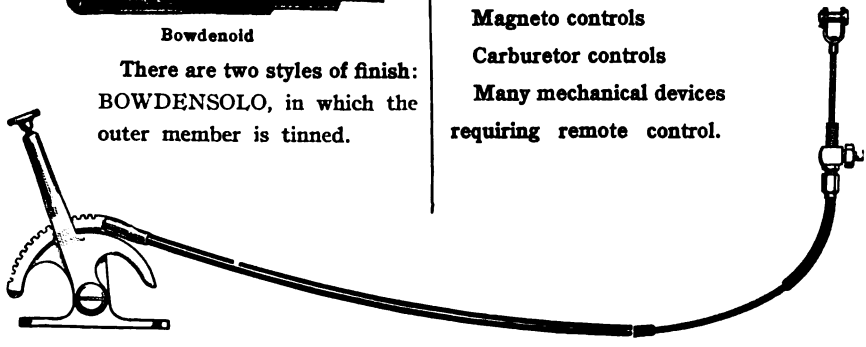
SPECIFICATIONS

OUTER MEMBER				INNER MEMBER
(Order by Number)		Approximate Dimensions of Bowden-solo		(Order by Size)
Bowdenoid	Bowden-solo	Bore	Outside	Diameter
11	31	.095	.165	1/16
12	32	.123	.193	5/64
13	33	.141	.223	1/8 or 7/64
14	34	.171	.253	9/64
15	35	.193	.288	11/64
16	36	.225	.320	3/16
51	71	.066	.136	1/27 or 1/32
	300	087	.182	
	301	.186	.250	
	302	.250	.320	
	303	.250	.332	
	304	.234	.316	

ADAPTED TO:

SEE OUR ADVTS. IN MECHANICAL ENGINEERING

Aircraft controls
Motorcycle controls
Motor boat controls
Locking devices
Brakes
Magneto controls
Carburetor controls
Many mechanical devices requiring remote control.



Digitized by Google

THE S. S. WHITE DENTAL MFG. CO.

FLEXIBLE SHAFT DEPARTMENT

COMPLETE EXHIBIT
BUSH TERMINAL SALES BUILDING
130 W. 42nd St., New York, N. Y.

MAIN ADDRESS AND
SALES OFFICE
84 Market St., New York, N. Y.

Manufacturers of Flexible Shafting



S. S. WHITE
FLEXIBLE SHAFTS

Successful application of the flexible shaft drive in portable and stationary apparatus has been the reward of careful study and experimentation.

Complicated and uneconomical methods of transmitting power, involving the use of gears, sectional shafting, universal joints, or a multiplicity of belts, and angle drives, are being replaced by the silent, steady, simple device—the flexible shaft.

Speedometer Drive:

A typical use of the flexible wire wound shaft is in speedometer driving, in which millions of feet of S. S. White shaft are proving its unequalled efficiency and economy in a very large field of application. Similarly for aeroplane tachometers, recording apparatus, valve control, the engine governor, for high speed or low speed requirements, the flexible shaft has unique advantages.

Adaptability of Shafts and Casings:

Wire shafts are constructed to suit their applications in a wide range of diameters and of appropriate grades of steel. Casings are of fabric or metal as the use demands, and fittings in great variety are regularly supplied or made to specifications.

Tool and Machine Applications:

For driving hand-guided tools, in die cutting, drilling, polishing, grinding, and for such devices as hair clippers and massage apparatus where flexibility, light weight and steady transmission of power are all vital to the complete success of the operation, S. S. White Flexible Shafts have an established preference.

S. S. White Die-Sinker Equipment:

We manufacture complete equipments including large and small handpieces, flexible shaft and casing combinations, couplings for motor attachment and bench stands for countershaft drive. Inquiry is invited for these standardized equipments and for any of the parts or units for use with portable grinding and drilling outfits of other design or manufacture.

Developmental Service:

The experience of our engineering department is at the service of manufacturers and designers contemplating the use of the Flexible Shaft for any purpose. Many of the most successful applications of the flexible shaft have been the direct results of collaboration between the purchasers and our engineers.

Digitized by Google

DETROIT OAK BELTING CO.

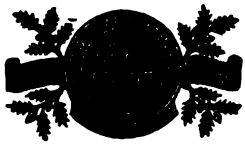
DETROIT, MICH.

CLEVELAND, O., 27 Noble Court
AGENTS THROUGHOUT UNITED STATES

Manufacturers of Leather Belting

FIRST QUALITY—OAK TANNED—REGULAR CEMENT:

Center portion only of high grade belting butts tanned to our own specifications. Made for general heavy service.



Single 16 to 18 oz. Double 29 to 33 oz. Extra heavy double 34 to 36 oz. 3 ply 46 to 48 oz.

Double thickness $\frac{3}{8}$" to $\frac{7}{16}$". 3 ply $\frac{9}{16}$" to $\frac{5}{8}$".

Medium weight. Recommended for general high speed service where heavy belt is not required.



Single 14 to 15½ oz. Double 26 to 28 oz. 3 ply 42 to 45 oz. Double thickness $\frac{5}{16}$" to $\frac{11}{32}$". 3 ply about ½" thick.

Light weight. Recommended for small pulleys. Single 12 to 13½ oz. Double 22 to 25 oz.



Reg. U. S. Pat. Office

Double thickness ¼" to $\frac{9}{32}$".

Used principally in double not over 12" wide.

SECOND QUALITY—OAK TANNED—REGULAR CEMENT:

SHORT LAP, moderate price belting made of selected side stock carefully stretched and curried.

Heavy





Medium

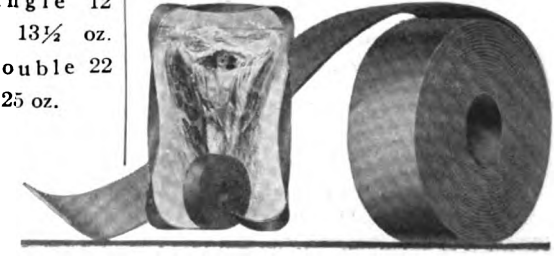
"NAIAD"—FIRST QUALITY—WATER PROOF:

GUARANTEED



Reg. U. S. Pat. Office

ALL WEIGHTS AND SIZES



Digitized by Google

THE ROSSENDALE-REDDAWAY BELTING AND HOSE COMPANY

NEWARK, N. J., U. S. A.

A fine copper wire is built into all Daleway Belts. It is a permanent trade-mark for your protection.

Manufacturers of the

DALEWAY
TRADE MARK

Line of Woven and Canvas Belting, including the original

"CAMEL" HAIR BELTING:

CAMEL HAIR CAMEL BRAND BELTING
REG. U.S. PAT. OFF.

1. "Camel Hair" Belting is woven of animal hair and cotton in such a manner that the animal hair is brought to the surface and comes in contact with the atmosphere surrounding the belt.

2. 100% more elastic than leather belting; 50% more than fabric belting.

3. Has a higher coefficient of friction than either.

4. Exceedingly pliable; drives safely, economically and effectively.

5. Transmits more power without straining shafts or bearings.

6. Perfectly uniform thickness, it runs true.

7. Permits use of thinner belts, which means lighter pulleys, and reduction of total load on shaft bearings.

8. Runs equally well in damp, dry or wet atmosphere.

9. Affected less by heat, oil, acids or fumes.

10. Tensile strength greater than best leather belting and almost twice that of best oak, tanned double leather belting.

11. Its high elasticity allows it to adjust itself readily and rapidly to varying shocks and strains, making it especially suitable to intermittent drives with heavy loads.

"DURBAR" SOLID WOVEN COTTON BELTING:

DURBAR BELTING

Made from highest grade long fibre cotton woven under tension to a solid one-piece fabric.

Uniform in surface, thickness and width.

Impregnated with a special waterproofing compound which resists dampness, oil, acid or alkaline fumes, heat or cold.

High frictional grip, constant pliability, unusual elasticity and long life.

Has no superior in cotton beltings.

"SENEGAL" SPECIALTY CANVAS BELTING:

SENEGAL SPECIALTY CANVAS BELTING

The highest grade of impregnated stitched-canvas belt.

Made of full weight 32-ounce duck, with flush stitching and special gum impregnation which retains pliability, preserves belt fibres, gives high frictional grip and is little affected by dampness, heat or cold.

Superior to other stitched-canvas or rubber belting under severe service conditions.

"SEMINOLE" RED STITCHED-CANVAS BELTING:

SEMINOLE RED STITCHED CANVAS BELTING

Made of "Standard" weight duck, specially impregnated, and painted.

The leader in this class of belts.

"CHEROKEE" RED STITCHED-CANVAS BELTING:

CHEROKEE RED STITCHED CANVAS BELTING

Made of 26-ounce duck, impregnated.

The paint used gives high frictional grip.

Digitized by Google

CHAS. A. SCHIEREN COMPANY

MAIN OFFICE: 30–38 FERRY ST., NEW YORK CITY

OAK LEATHER TANNERIES
BRISTOL, TENN.

BELTING FACTORIES
NEW YORK, N. Y. & BRISTOL, TENN.

BRANCHES

Atlanta, Ga., Boston, Mass., Chicago, Ill., Cleveland, O., Denver, Colo., Detroit, Mich., Kansas City, Mo., Memphis, Tenn., Newark, N. J., New York, N. Y., Philadelphia, Pa., Pittsburgh, Pa., Salt Lake City, Utah, San Francisco, Cal., Seattle, Wash.

The Texas Chas. A. Schieren Company, Dallas, Texas

Tanners and Manufacturers of Leather Belting of all kinds. Link Leather Belting, Round Leather Belting, Lace Leather, Cut Leather, Rawhide Rope, Hydraulic Leather, Hydraulic Packings, Belt Dressing, Belt Cement, Leather Specialties

DUXBAK NUTAN "Steamproof" Leather Belting, tanned by a special Schieren process is proof against steam, heat, and moisture, and resists acid fumes. In fact, it can be boiled without affecting the leather. Due to its exceptional elasticity minus excessive stretching it snugly hugs the smallest to the largest pulleys. Possessing a high coefficient of friction and tensile strength, DUXBAK NUTAN transmits the full load with minimum slippage.

DUXBAK BELTING TRADE MARK
STEAMPROOF NUTAN

DUXBAK "Waterproof" Leather Belting is made of first quality center stock oak tanned leather. It is absolutely waterproof. Due to its ability to withstand the most severe service and climatic conditions, DUXBAK is the favorite belting throughout the world.

DUXBAK BELTING TRADE MARK
WATERPROOF

BULL'S HEAD is a popular main drive belt for dry places and where overloads are frequent. It's an oak tan belt made heavy in all sizes.

BULL'S HEAD

ROYAL EXTRA Leather Belting is a strictly first class leather belting cut from center stock. It is the ideal belting for use in mills, shops, factories, etc.

ROYAL EXTRA

EAGLE BRAND Leather Belting is a light-double belting suitable for motor and other high speed work. There's a Schieren Brand to meet every belting need.

EAGLE BRAND

FACILITIES:

Our facilities both at our New York and Bristol factories are ample to give all orders prompt and efficient attention. Our Tanneries, located at Bristol, Tennessee, have a capacity of more than 100,000 heavy hides per year. Our Distributing Branches and Dealers, located in all the leading cities throughout the World, carry a full line of all brands of Schieren Belting ready for prompt shipment.

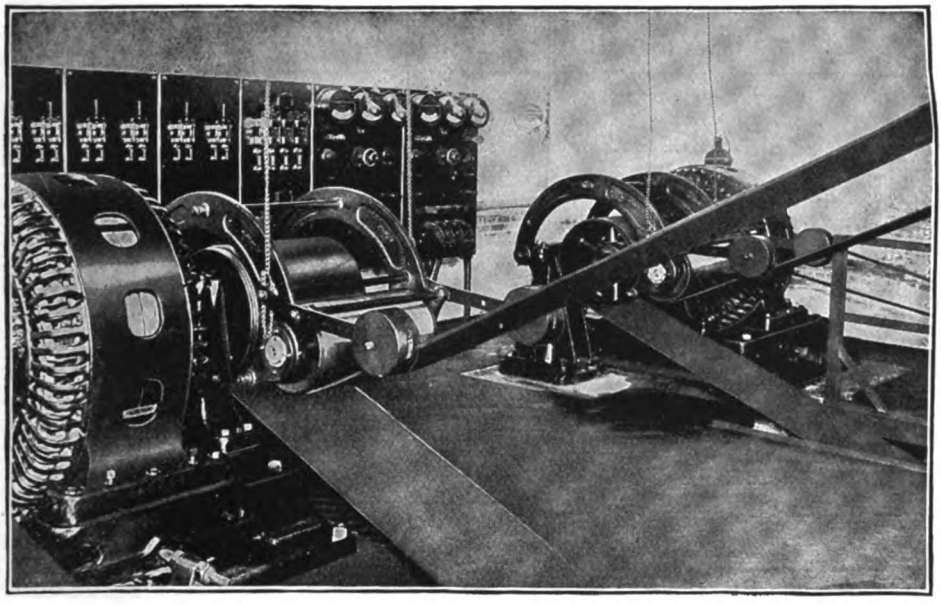
SERVICE:

The Chas. A. Schieren Company's more than fifty years' experience in tanning and manufacturing leather belting is at your disposal. Our Service Engineers will gladly make a study of your belting needs and recommend the right belt for every drive. On every ten feet of our belting appear their respective Trade Marks and the signature of Chas. A. Schieren Company—your guarantees to good belting.

For further data, wire, 'phone, or write our nearest address.

Digitized by Google

CHAS. A. SCHIEREN COMPANY NEW YORK, N. Y.



DUXBAK NUTAN LEATHER BELTING:

DUXBAK BELTING
TRADE MARK
STEAMPROOF
NUTAN

DUXBAK NUTAN is particularly adapted to Generators, Motors, Main Drives, Pumps, Blowers, Compressors, or drives where the arc of contact is poor, the belt speed high, load intermittent, or working conditions unfavorable.

Fluctuating and heavy overloads require a belt of considerable elasticity and high tensile strength.

Insufficient arc of contact on small pulleys running at high speed, needs a belt of extreme pliability and having an exceptional frictional surface.

DUXBAK NUTAN combines each of these features and its tannage makes it proof against steam, heat and water, also gives it greater resistance to alkalies and acid fumes. **DUXBAK NUTAN** can be boiled without injuring the belt in any way.

Let our Service Engineers tell you more about it.

Digitized by Google

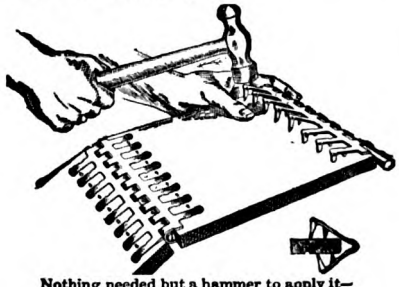
FLEXIBLE STEEL LACING CO.

4638 LEXINGTON ST., CHICAGO, ILL.

Manufacturers of Steel Belt Lacing, Electric Lamp Guards

ALLIGATOR
TRADE MARK REG U.S. PAT. OFFICE
STEEL BELT LACING

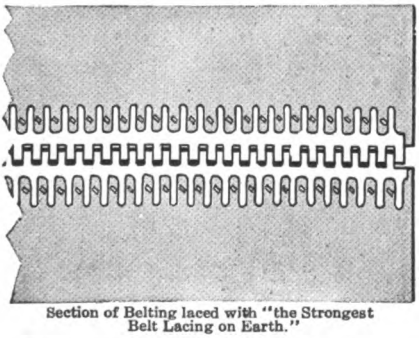
Compare your present lacing point by point with these features of ALLIGATOR Steel Belt Lacing.



Nothing needed but a hammer to apply it—and you already have a hammer.

"ALLIGATOR" is easiest to apply. Requires no tool but a hammer and only three minutes average time. Anyone can put it on.

Makes a permanent hinged joint that can be run on both sides, and works equally well on any width or thickness of belting. The separable joint permits lacing of overhead belts on the floor. The belt is then put in position over the shafting and hinge pins inserted.



Section of Belting laced with "the Strongest Belt Lacing on Earth."

The sectional steel Rocker hinge pin is serviceable under all conditions, including damp and wet work where a rawhide hinge is not satisfactory.

The staggered teeth (see illustration) penetrate lengthwise through the belt and clinch on both sides leaving the burden-carrying fibers intact.



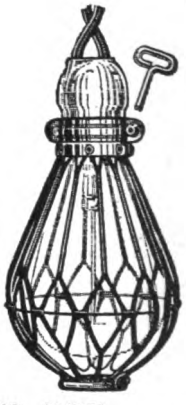
Rocker pin makes possible the use of a hinge belt joint in damp places and under heavy loads where a rawhide pin will not stand up.

Because of these reasons—ease and facility of application, long life in operation, belt-saving characteristics and economical features—ALLIGATOR is chosen in every industry all over the world. The decision of hundreds of thousands of belting users should influence you.

In practical and technical tests Alligator has satisfied manufacturers and users of all kinds of belting that it is the strongest, most permanent lacing of any type.

It is given highest endorsement by leading manufacturers of belting because of the added life and service it renders possible in their products. Alligator is widely distributed and easily obtainable.

FLEXCO-LOK
(REG. U. S. PAT. OFFICE)
STEEL LAMP GUARDS:



A mechanically perfect reenforced expanded steel guard —hinged at the base —closed with either plain slotted or patent key locking screws.

A Reflector type is made for use where concentrated light is desired—Flexco split handle portables are also a convenience and lamp savers.

The best equipment for every plant as protection against accidents, delays, fire and unauthorized removal of bulbs. Used extensively in the best equipped buildings and plants in the country.

Complete information, free hand book for belt users "Short Cuts to Power Transmission," samples and source of supply will be sent upon letterhead request.

NEVER LET'S GO



(REG. U. S. PAT. OFFICE)

Digitized by Google

Conveying, Hoisting and Transporting Machinery

EQUIPMENT CATALOGUED IN THIS DIVISION

Data begins on page number given, as closely as can be divided. Consult Directory Section (green pages) for specific products.

	PAGE
Buckets, Conveying	370
Buckets, Crane and Hoist	408
Cableways	388
Cars, Industrial	382
Chains, Elevating and Conveying	370
Chains, Loading	410
Coal Mine Equipment	376
Conveyors	367
Cranes, Locomotive	383
Cranes, Traveling	394
Crushers and Pulverizers	376
Derricks	383
Dispatch Tube Systems, Pneumatic	378
Dredging Machinery	388
Dumbwaiters	407
Elevators, Bucket	367
Engines, Hoisting, Steam	383
Hoists, Chain and Gear	402
Hoists, Drum	383
Hoists, Electric	394
Hoists, Telescopic	406
Loaders, Portable	377
Locomotives, Industrial Electric	374
Rope, Wire	409
Tractors, Industrial	382
Tramrail Systems	390
Trucks, Industrial	382
Winches	384

See next page for list of firms catalogued

CATALOGUE SECTION

PART IV **Pages 365–410**

Digitized by Google

INDEX TO FIRMS CATALOGUED IN PART IV

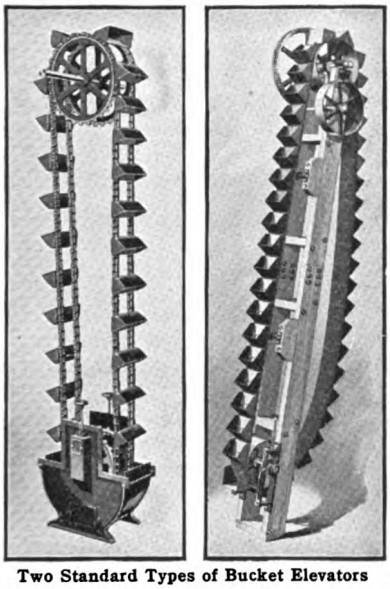
	PAGE
A	
American Hoist & Derrick Co.	383
B	
Baker, R. & L. Co.	382
Bartlett, C. O. & Snow Co.	367
Beaumont, R. H. Co.	368, 369
Box, Alfred & Co. (Inc.)	394
Brown Hoisting Machinery Co.	390
C	
Caldwell, H. W. &. Son Co.	370
Connellsville Mfg. & Mine Supply Co.	384
Conveying Weigher Co.	371
F	
Ford Chain Block Co.	404
G	
Gifford-Wood Co.	372
Gillis & Geoghegan	406
H	
Holmes, Robt. &. Bros. (Inc.)	386, 387
Hunt, C. W. Co. (Inc.)	374, 375
I	
Industrial Works	392, 393
J	
Jeffrey Mfg. Co.	376, 377
L	
Lamson Co.	378, 379
Lidgerwood Mfg. Co.	388
M	
Maris Bros. (Inc.)	395
Morris, Herbert (Inc.)	402
N	
Newhall Chain Forge & Iron Co.	410
New Jersey Foundry & Machine Co.	396
Northern Engineering Works	397
O	
Ohio Locomotive Crane Co.	391
Ottumwa Iron Works	385
P	
Pawling & Harnischfeger Co.	398
R	
Reading Chain & Block Corp'n.	403
Robins Conveying Belt Co.	373
Roebling's, John A. Sons Co.	409
S	
Sedgwick Machine Works	407
Shepard Electric Crane & Hoist Co.	400, 401
Standard Conveyor Co.	380
Stuebner, G. L. Iron Works	408
T	
Terry, Edward F. Mfg. Co.	389
Toledo Crane Co.	399
W	
Weller Mfg. Co.	381
Y	
Yale & Towne Mfg. Co.	405

Digitized by Google

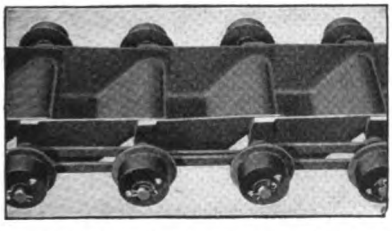
THE C. O. BARTLETT & SNOW CO.

CLEVELAND, OHIO, U. S. A.

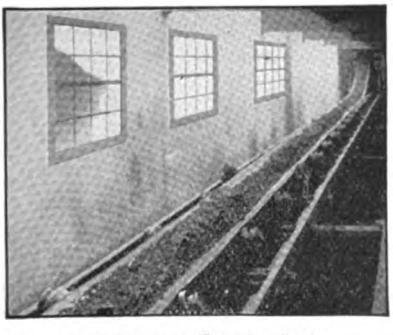
Designers and Builders of Dependable Equipment for the Handling and Preparation of Materials. Conveying and Elevating Machinery; Skip Hoists; Dryers; Crushers; Screens; Mixers; Foundry Sand Handling Equipment



Two Standard Types of Bucket Elevators



Common Sense Pan Conveyor for Carrying Hot, Corrosive, or Abrasive Materials



Belt Conveyor Carrying Coal

BARTLETT AND SNOW CONVEYING AND ELEVATING MACHINERY:

Bartlett and Snow Conveying and Elevating Machinery is built primarily for those conditions which are unusual or exacting.

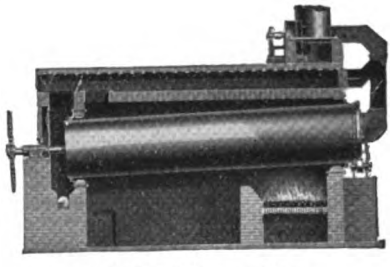
We enjoy coöperation with engineers in the design of conveying equipments for foundries, power plants, steel mills, chemical works, and industrial plants in general. Coöperation of this sort invariably results in plants which are more profitable, more productive, and more human.

BARTLETT AND SNOW DRYERS:

There are thirteen distinctly different types of Bartlett and Snow Dryers each of which has its particular field of application.

Of these thirteen types, the Style C is unusually well fitted for drying coal in pulverized coal plants.

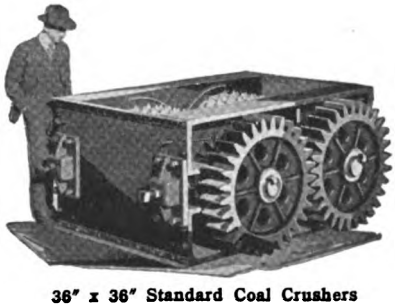
367



Style E Double Pass Dryer

BARTLETT AND SNOW COAL CRUSHERS:

Include single roll crushers, two roll crushers, and four roll crushers.



36″ x 36″ Standard Coal Crushers

Digitized by Google

R. H. BEAUMONT COMPANY

MAIN OFFICE
340 ARCH ST., PHILADELPHIA, PA.

BRANCH SALES OFFICES

NEW YORK
CHICAGO
CLEVELAND
DETROIT
PITTSBURGH
BOSTON

Builders of Beaumont Skip Hoists, Weigh Larries, Drag Scrapers and Beaumont Super Central Coal and Ash Handling Systems

What the Beaumont Company Is and Does:



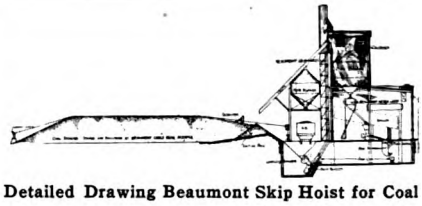
Beaumont Cable Drag Scraper in Operation

For more than a quarter century the R. H. Beaumont Company has been devoting its time exclusively to the construction and erection of machinery for handling coal, coke and ashes. Concentration along these lines has resulted in the development of coal, ashes and coke handling machinery which has in actual operation proved itself to be the most efficient for the purpose.

These machines are divided into three classes—Beaumont Cable Drag Scrapers, Beaumont Skip Hoists, and Beaumont Weigh Larries. The combination of all three devices comprises the Beaumont Super Central Coal and Ash Handling System—a system far-and-away ahead of any other coal and ash handling method as yet devised.

BEAUMONT CABLE DRAG SCRAPER:

Coal is discharged from the cars into a track hopper and elevated to a chute which piles it up. The Drag Scraper then distributes it over the storage area,—a piece of ground of any size or shape adjacent to the boiler house or railroad siding. A machine house contains driving drums to which is attached the steel cable controlling the Scraper. When coal is needed in the boiler house the operation is reversed and the Drag Scraper brings back the coal.



Detailed Drawing Beaumont Skip Hoist for Coal

Some of the advantages of the Beaumont Cable Drag Scraper are:

1. Coal Storage Area any Size or Shape
2. Hourly Capacity Exceptionally High—up to 600 Tons
3. Operated by Unskilled Labor. No Licensed or Experienced Engineer Needed
4. Maintenance Cost Low
5. System will Fight Fire Quickly and Efficiently
6. Will Handle Lump or Crushed Coal
7. No Expensive Trestle Work Required
8. The Salvage Value is High

These advantages are discussed in detail in the Beaumont book No. 45 on Cable Drag Scraper System. A copy sent on request.



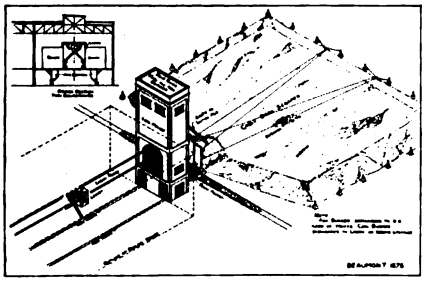
Beaumont Weigh Larry

Digitized by Google

R. H. BEAUMONT COMPANY — PHILADELPHIA, PA.

BEAUMONT SKIP HOIST:

The Beaumont Skip Hoist is designed to handle coal, ashes and coke. The Skip Hoist consists of a bucket running on inclined or vertical tracks and hoisted by a steel cable attached to a winding machine. The Beaumont Skip Hoist is the most advanced and economical method of handling coal, ashes and coke. It is built to handle from 10 to 300 tons of coal per hour at a lift of 50 feet.



Detailed Drawing Beaumont Super Central System

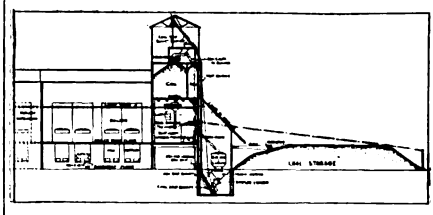
The most important Beaumont Skip Hoist advantages are:

1. Not Affected by Heat, Grit or Water
2. Unusually High Capacity
3. Low Operating and Installation Cost
4. Minimum Power Consumption
5. No Complicated Working Parts and Consequently Freedom from Break-Downs and Heavy Repair Bills
6. Handles Lumps, Fines, etc.

Catalogue No. 50 explains how and why the Beaumont Skip Hoist cuts the cost of coal, ashes and coke handling to the bone.

BEAUMONT WEIGH LARRIES:

A Larry is a plate hopper suspended on scales and mounted on a truck running on overhead tracks. It takes coal from overhead coal bunkers, keeps accurate weight of the coal and delivers it to the stokers. Built to handle from ½ to 25 tons at a time.



Detailed Drawing Beaumont Cable Drag Scraper

BEAUMONT SUPER CENTRAL SYSTEM:

With this system all machinery is housed in a central structure and one man cares for the coal from the time it arrives until it is carted away in ashes or coke. A Beaumont Cable Drag Scraper stores the coal. A Beaumont Skip Hoist distributes coal to the bunkers. A Beaumont Larry feeds the stoker. The by-product,—ashes or coke—is brought to the Skip Hoist by an electric or hand-driven car and stored in an ash bunker over the railroad siding. There is no lost motion.

The Beaumont Super Central Coal, Ashes and Coke Handling System has these advantages to its credit:

1. Lowest First Cost, made possible by Concentrated Construction
2. Lowest Maintenance Expense; No Expensive Distributing Conveyors or Complicated Parts
3. Lowest Power Consumption
4. Maximum Light and Ventilation
5. Eliminates Chain Elevators and Conveyors
6. Lowest Labor Cost—One Man Does All

Write for the Beaumont book No. 40 "Coal and Ash Handling Systems for Boiler Houses" which gives explicit information on all three Beaumont devices and the Super Central System.

The experience of the R. H. Beaumont Company is at your disposal, whether you plan to build a new boiler house or to install coal and ash handling equipment in an existing plant.

Digitized by Google

H. W. CALDWELL & SON COMPANY

LINK-BELT COMPANY, OWNER

17TH ST. AND WESTERN AVE., CHICAGO, ILL.

EASTERN OFFICE: 50 Church St., NEW YORK CITY
709 Main St., DALLAS, TEXAS

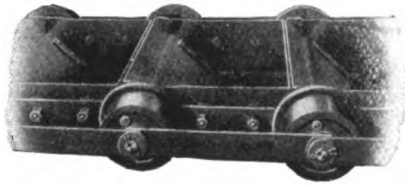
Manufacturers of Elevating, Conveying and Power Transmitting Machinery; Machinery for Handling Material in Bulk or Packages

"HELICOID" CONVEYORS:



Sole manufacturers of "HELICOID" SCREW CONVEYOR made of one continuous strip of metal without laps or rivets. Mounted on standard and extra heavy pipe or solid shafts.

PAN, APRON AND BELT CONVEYORS:



Each designed and built to handle the material for which it is best suited, to the best advantage. For COAL, COKE, SAND, CRUSHED STONE, GRAVEL, GRAIN, BOXES, BARRELS, etc.

CHAINS:



Standard Malleable Iron Detachable Chain. Malleable and steel bushed chains with or without rollers. Special chains for Conveying, Elevating or Power Transmitting Purposes.

CHILLED RIM SPROCKETS:

The life of the Chilled Rim Sprocket is from Three to Five times that of the ordinary grey iron sprocket. Traction wheels and special sprockets furnished.

BUCKETS:



We carry a large stock of standard size and weight Salem, Seamless Steel and Malleable Buckets. We are equipped to make special buckets of all kinds to order.

GEARS:

We can furnish gears with cast Teeth Machine Molded or Machine Cut. We have the most complete equipment in the country for machine molding gears. Spurs, Bevels, Miters, Worms, Worm Wheels and Mortise Wheels.



We are prepared to furnish sheet steel conveyor troughs, hoppers, elevator casings, spouting, etc.

For a complete list of our line see a copy of our No. 45 catalogue. 800 pages of useful information to every engineer, designer, plant owner or superintendent.

SEE OUR ADVTS. IN MECHANICAL ENGINEERING

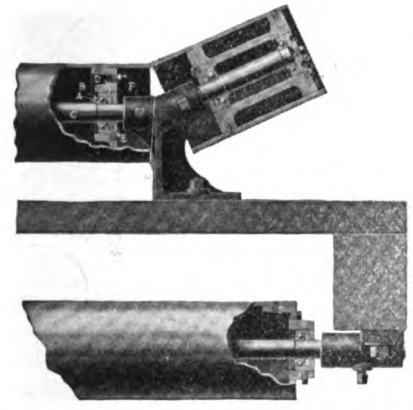
Digitized by Google

THE CONVEYING WEIGHER CO.

90 WEST STREET, NEW YORK, N. Y.

Ball Bearing Belt Conveyors; Continuous, Automatic Scales for Belt and Other Conveyors; Conveying and Hoisting Machinery; Complete Material Handling Plants; Trump Measuring and Mixing Machines; Trump Concrete Mixers; Loaders

AGENCIES: HERBERT AINSWORTH, ESQ., The Corner House, JOHANNESBURG, S. AFRICA
THE A. M. ELLICOTT CO., 338 St. James Street, MONTREAL, CANADA
MR. FRANK R. PERROT, Aberdeen House, 204 Clarence St., SYDNEY, N. S. W.
MR. LUCIEN HERMAN, 18 Rue Jules Van Praet, BRUSSELS, BELGIUM
VICTOR M. BRASCHI MACHINERY COMPANY, MEXICO, CITY, MEX.
ZIMMER CONVEYOR COMPANY, 82 Mark Lane, LONDON, E. C., ENG.
MANHATTAN RUBBER MFG. CO., 2017 Fourth Ave., North, Birmingham, Ala.
MANHATTAN RUBBER MFG. CO., Hurt Bldg., Atlanta, Ga.
MANHATTAN RUBBER MFG., CO., El Paso, Texas — CAMERON & BARKLEY CO., Tampa, Fla.
CAMERON & BARKLEY CO., Charleston, S. C. — SALT LAKE HARDWARE CO., Salt Lake City, Utah
NORTON SALES CO., Nashville, Tenn. — H. W. MOORE & CO., Denver, Colorado



'Conweigh" Ball Bearing, Troughing and Return Idlers for Belt Conveyors (Patents Pending)

BALL BEARING BELT CONVEYORS:

We illustrate herewith the construction of ball bearing troughing and return idlers for belt conveyors. It is guaranteed that if a belt conveyor running level be equipped with these idlers there will be a saving of 40° in power required. These idlers, having felt, oil-retaining washers, need to be lubricated only once in two years.

A—Hardened steel "Cone" fitted on turned steel shaft.

B—Pressed steel "Ball Retainer."

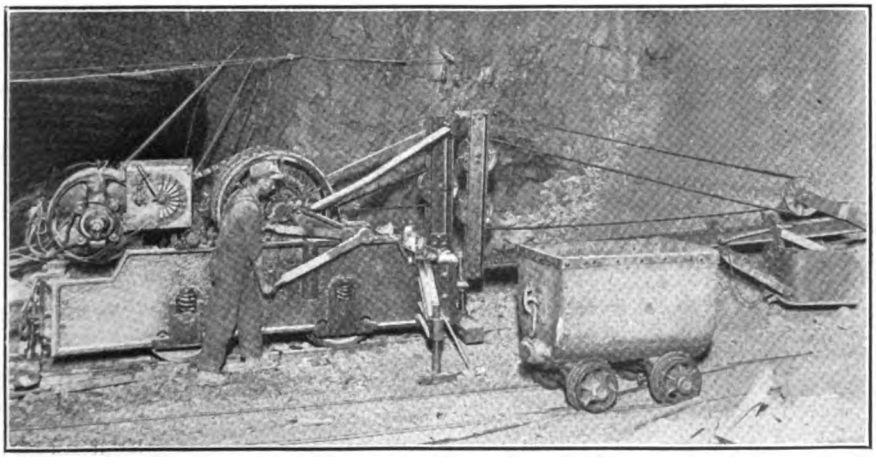
C—Turned steel shaft, set screwed in Idler brackets.

D—Oiled washer of felt or carded wool.

E—Hardened steel "Plug" screwed into pulley hub.

F—Brass plug for lubrication.

G—Lock screw to prevent hardened plug from turning.



"CONWEIGH" ELECTRICALLY DRIVEN SELF PROPELLING LOADERS

The above loader is for stope or surface use, loading 30 tons of ore per hour. Requires 11 feet head room for boom. Will clean up a breast 16 feet wide. Car tracks to one side of loader.

Digitized by Google

GIFFORD-WOOD CO.

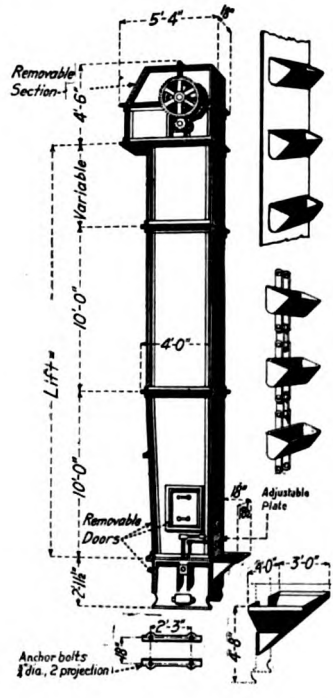
MAIN OFFICE AND WORKS: HUDSON, N. Y.

SALES OFFICES AND STOCKROOMS
CHICAGO, 565 W. Washington St.
BOSTON, 51 No. Market St.

SALES OFFICES
BUFFALO, Electric Bldg.
NEW YORK, 50 Church St.

Manufacturers of General Elevating and Conveying Machinery for Handling Coal, Ashes, Stone, Sand, Gravel, Ice and bulk materials of all kinds. Pivoted Bucket Carriers, Belt and Apron Conveyors, Grain Elevator Machinery, Warehouse Conveyors, Wagon Loaders. Screens of all kinds, Friction Clutches, Gray Iron Castings, Hoists, Icing Station Equipment, Etc.

GIFFORD-WOOD STANDARDIZED ELEVATORS:

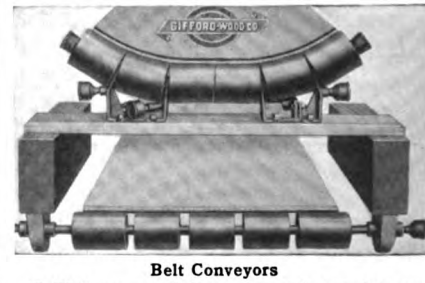


Variations in standard parts give a wide range of service, handling ashes, sand, gravel, coal, grain, salt and other granular materials with lumps up to 2" cubes. Capacities range from 500 to 1000 cu. ft. per hour. Driven by motor through spur gears or by belt from lineshaft. For full particulars address our nearest office.



SEE OUR ADVTS IN MECHANICAL ENGINEERING THE JOURNAL OF THE ASME

Continuous Bucket Elevators



Belt Conveyors

G-W Conveyor Belts are manufactured to our own specifications and sold under the registered trade-names, Duralife and Goodworth. We furnish Belt Conveyors for all purposes.



Warehouse and Platform Conveyors

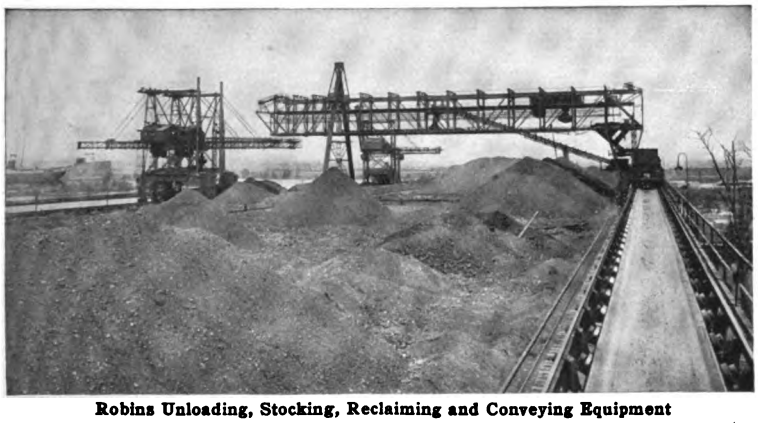
Digitized by Google

ROBINS CONVEYING BELT CO.

Manufacturers of Conveying Machinery

PARK ROW BUILDING, NEW YORK

CHICAGO OFFICE: Old Colony Bldg.
BOSTON: 70 Kilby Street
SAN FRANCISCO: The Griffin Co.
LONDON: Fraser & Chalmers Engrg. Wks.
PITTSBURGH: Union Arcade Bldg
BIRMINGHAM: C. B. Davis Eng. Co.
TORONTO: Gutta Percha & Rubber, Ltd.
JOHANNESBURG, SO. AFRICA: Robins Conveyors, Ltd.



Robins Unloading, Stocking, Reclaiming and Conveying Equipment

The Robins Conveying Belt Company is prepared to design and install conveying machinery to meet any requirement. The machinery includes belt conveyors, bucket elevators, unloading towers, stocking and reclaiming bridges, coal or ore storage and reclaiming systems, coke cooling wharfs, ore bedding and reclaiming systems, standard and adjustable coal or coke crushers, and the auxiliary equipment such as chutes, feeders, screens of various types, etc.

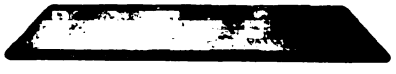
Robins machinery is handling coal, coke, ashes, ore, limestone, clinker, cement in bulk and in bags, wet concrete, sand, crushed stone, dirt, gypsum, phosphate rock, salt, grain, wood chips and pulp, rubbish, packages of all kinds and many other materials.



Robins Standard Troughing Idler

Robins machinery parts are fitted for compression grease cup lubrication to protect the bearings from dust and corrosion. Consequently troubles resulting from these causes are practically eliminated under the most severe operating conditions.

Robins Conveyor Belts are made in a number of different grades of conveyor belting, both of the stepped-ply and straight-ply construction, each grade being designed to give the most economical service under certain operating conditions. If it is believed that none of the standard brands of belts will give satisfactory service because of unusual conditions, a special grade of belt will be designed for the work.



Robins Stepped-Ply Conveyor Belt

Robins stepped-ply belts have thicker rubber cover in the center than at the edges, thus giving more protection where the abrasion is greatest. A belt of this construction is flexible laterally, allowing it to conform to the shape of the troughing idlers, and causing it to run true even when empty.

The Robins "Handbook of Conveyor Practice" will prove of value to engineers who are planning for or designing conveyor installations. It contains a group of useful tables concerning capacities, power requirements, speeds of conveyors and similar matter; dimensions of conveyor parts, together with general data on conveyor practice. We will be glad to send a copy on request.

Digitized by Google

C. W. HUNT COMPANY, INC.

WEST NEW BRIGHTON, STATEN ISLAND, NEW YORK

BRANCH OFFICES

CHICAGO NEW YORK CITY BOSTON WASHINGTON, D. C.

Manufacturers of Coal and Ash Handling Machinery, Pivoted Bucket Conveyors, Hoisting and Conveying Machinery, Cable and Automatic Railways, Skip Hoists, Industrial Railway Equipments, Electric Locomotives, Motor Cars, "Stevedore" Manila Transmission and Hoisting Rope, Special Scales and Weighing Hoppers, Coal Crackers

PIVOTED BUCKET CONVEYORS:

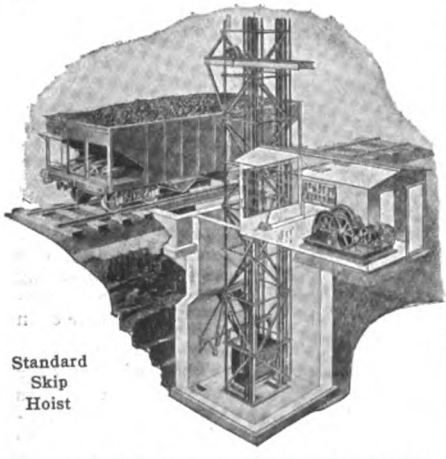


Upper Run of Hunt Conveyor at Omaha Electric Light & Power Plant

Consist of a series of independent swinging buckets free to dump in either direction. Conveyors can run in any direction, the buckets hanging in an upright position, therefore dry or liquid material can be handled. The peculiar system of driving by a pawl relieves the conveyor wheels of all stress.

Ask for Catalog U 20-2 on "Conveyors."

SKIP HOISTS:



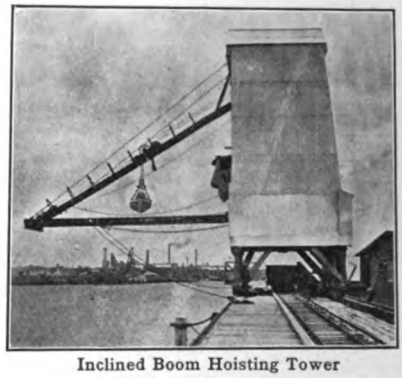
Standard Skip Hoist

Consists of load-carrying bucket, wire hoisting rope, head and leading sheaves, electric single drum hoisting engine with motor, traveling cam control and electrically operated brake, bucket guides, loading pit valve or loading chute, control panel and push button station for operating machine.

Single bucket skip is counterweighted and guides constructed for properly guiding counterweight and bucket. Electric skips with drum type controller and steam hoist friction operated skips of high speed can be furnished if desired. Skip hoists can be operated equally well whether vertical or inclined

Capacities from 25 to 300 tons per hour.

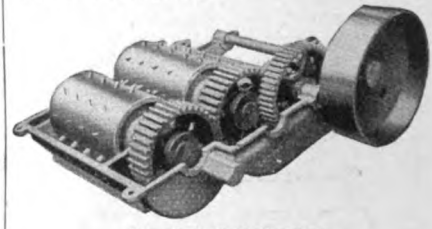
COAL HOISTING TOWERS:



Inclined Boom Hoisting Tower

The Hunt towers are especially adapted for the rapid unloading of vessels. Furnished steam or electrically operated, one-man control; with hoisting capacity of from 100 to 300 tons per hour.

COAL CRACKERS:



Complete Coal Cracker

For breaking lump bituminous coal into pieces small enough to feed through automatic stokers. Rolls have renewable hardened steel chisel points that split or crack instead of crushing the lumps. Bearings and mechanism protected from dust. Cracker may be placed below hopper under railway car track, so that coal feeds directly from car into conveyor. Can also be suspended from overhead beams, or be supported from below. Steam or electrically operated.

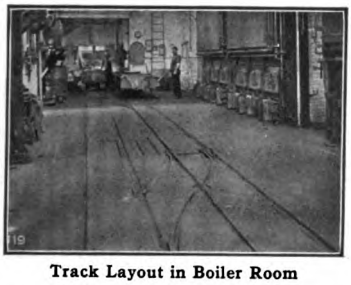
Digitized by Google

C. W. HUNT COMPANY, INC., W. NEW BRIGHTON, S. I., N. Y.

INDUSTRIAL RAILWAY AND EQUIPMENT:

Tracks—Laid on any form of floor or roadbed and can be run across or between standard gage railway tracks without cutting the rail heads, run out on trestles or in tunnels. Made up in sections of 20-ft. length with ties spaced every 24½ in. Rails are furnished either riveted to steel cross-ties or having cast tie plates integral with rail or knocked down steel track. Track gage from outside of one rail head to other is 21½ in.

Combination of switches are left- or right-hand 2-way or 3-way, furnished with or without stands. Also, the above can be furnished in cast plate. Frogs, crossovers and turntables are also manufactured. Any workman of ordinary intelligence can put together a whole system ready for use.



Track Layout in Boiler Room

Cars—Bodies of various designs to meet a wide range of use, but all have essentially same truck construction. Axle bearings are either plain or roller bearing. Arrangement of running gear facilitates propulsion on short curves. Standard width for clearance of cars is 4 ft. Curve radius, 12 ft.

ELECTRIC LOCOMOTIVES:



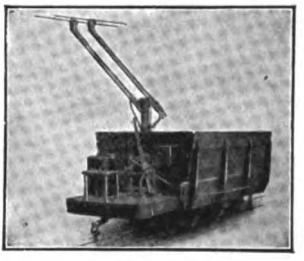
Hunt Electric Locomotive

Narrow gage electric locomotives in connection with industrial railways further reduce cost of handling material. Designed to take full load around 12-ft. radius curves as easily as on straight track.

Various types of locomotives are made to pull loads up to 50 tons.

Standard machine as shown is built for any track gage from 18 to 36 in. Minimum curve radius, 10 ft. Rated draw bar pull, 800 lbs., at 4 miles per hour; steel wheels slip at 1600 lbs. starting pull. The operator is protected by sliding top on cab. Over-all height from top of rail to top of cab, 52 in. Battery capacity ample for full day's work. Battery box easily removable for extra set of cells, for 24 hours' service.

MOTOR CARS:



Motor Driven Self-Dumping Car

Locomotives can be equipped with storage battery for motive power, or current can be taken from overhead trolley or from third rail. Motors and gears are housed to protect them from injury and dust. Speed, variable, from 1 to 10 miles.

Also load carrying motor cars, 1-ton to 10-ton capacities.

GATE VALVE:

Fig. shows a low body duplex valve with outside flanges particularly suitable for ash hoppers.



Low Body Duplex Valve

If the conditions are unfavorable for the operation of any other type of cut-off valve, these duplex valves will be successful. They are heavily built and are not quickly burned out.

OVERHEAD WEIGHING LARRIES:

Built to meet existing conditions with one way or bifurcated chutes to serve a single or double line of stoker hoppers. Accurate records of coal consumption registered on cards. Manually or electrically operated either from boiler room floor or cab. Capacities ½ ton and up.



Over-Head Weighing Larry

Digitized by Google

THE JEFFREY MFG. CO.

904 North Fourth St., COLUMBUS, OHIO

BRANCHES

New York	Cleveland	St. Louis	Birmingham
Boston	Milwaukee	Denver	Dallas
Philadelphia	Chicago	Los Angeles	Detroit
Pittsburgh	Scranton	Charleston, W. Va.	Montreal
		Buffalo	

Manufacturers of:

CONVEYERS—Apron, Scraper, Belt, Pan, Pivoted Bucket, Spiral and other types.

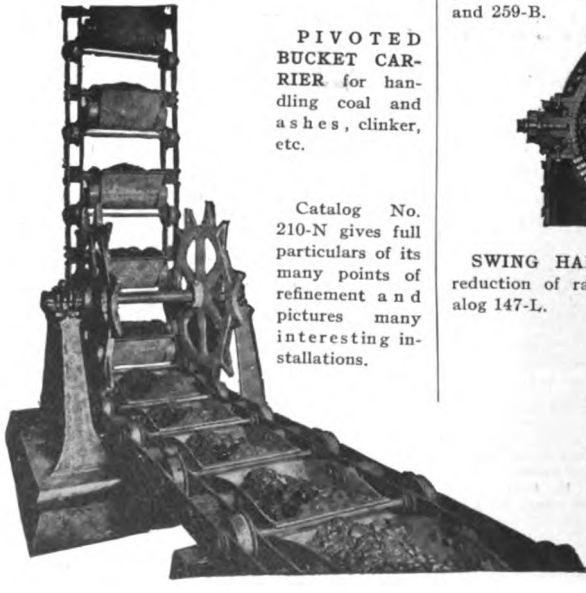
ELEVATORS—Tray, Barrel Arm, Bucket, etc.

CHAINS—All types for elevating, conveying and transmission purposes; Sprocket wheels, etc.

CRUSHERS, PULVERIZERS, SHREDDERS, PORTABLE LIME-PULVERS, ETC.

Portable Self-Propelling Loaders for handling loose material to wagons, trucks, railroad cars, etc.

COAL MINE AND TIPPLE MACHINERY EQUIPMENTS, including Coal Cutters, Drills, Pit Car Loaders, Locomotives, Car Hauls, Screens, Elevators, Conveyers, Picking Tables and Adjustable Loading Booms, Ventilating Fans, Crushers, etc.



PIVOTED BUCKET CARRIER for handling coal and ashes, clinker, etc.

Catalog No. 210-N gives full particulars of its many points of refinement and pictures many interesting installations.



Patented

JEFFREY SINGLE ROLL COAL CRUSHER for Mine, Power House and Coaling Station. Reduces lump and run-of-mine coal to stoker size in a single operation. Catalog No. 141-I



SWING HAMMER SHREDDER for the preparation of fibrous materials. Catalogs 245-D and 259-B.



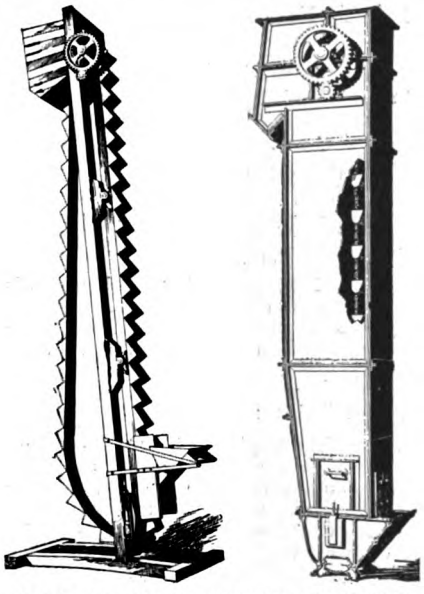
SWING HAMMER PULVERIZER for the reduction of raw and fibrous materials. Catalog 147-L.



DOUBLE ROLL CRUSHER for reducing coal and coke. Bulletin No. 248-D.

Digitized by Google

THE JEFFREY MFG. CO. COLUMBUS, OHIO



Catalog No. 244-S on **JEFFREY STANDARDIZED ELEVATORS** contains over 50 pages of complete layouts and specifications,



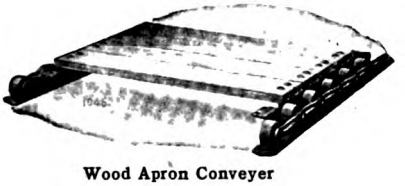
Showing how Jeffrey Belt Conveyers and Trippers uniformly and automatically fill large bin storage space. Catalog 175-W.



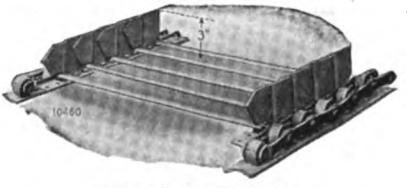
Jeffrey Storage Battery Industrial Locomotive. Catalog No. 231-K.



PORTABLE BUCKET DIGGER AND LOADER for handling crushed stone, sand and gravel, ashes, coal, coke, etc. Catalog Nos. 288-S and 309-M.

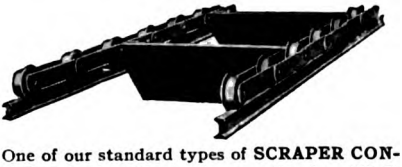


Wood Apron Conveyer



Steel Apron Conveyer

JEFFREY STANDARD WOOD AND STEEL APRON CONVEYERS for handling packages, bags, barrels, boxes, and loose materials are fully described in Catalog 258-L.



One of our standard types of **SCRAPER CONEYERS** for handling coal, etc. Catalog 257-C.

Our Catalogs on the various types of Jeffrey Elevating and Conveying Machinery are text books, containing valuable information, data and layouts for Engineers.

SEE OUR ADVTS. IN MECHANICAL ENGINEERING THE JOURNAL OF THE A.S.M.E.

Digitized by Google

Pneumatic, Selective and Mechanical Conveyors

THE LAMSON COMPANY

GENERAL OFFICES

100 BOYLSTON ST., BOSTON, MASS.

REPRESENTATIVES IN ALL PRINCIPAL CITIES

WORKS
LOWELL, MASS. TORONTO, CAN.

Builders of Pneumatic, Selective and Mechanical Carriers and Conveyors

Products:

CONVEYING SYSTEMS for Cash, Papers, Merchandise and Products for All Industries.

PNEUMATIC DISPATCH TUBE SYSTEMS.

CONVEYORS: Gravity Roller, Belt, Apron, Slat, Drag Chain, and Automatic Selective Power.

SPIRAL CHUTES; SPIRAL CONVEYORS.

SELECTIVE OVERHEAD POWER CONVEYORS.

Light Hand and Electric Power Elevators and Lifts; Electric Cable and Wire Line Cash and Parcel Carriers; Sectional Metallic Receiving and Storage Bins.

TRADE MARK

Adaptability of Lamson Conveying Systems:

Lamson automatic conveying systems are as varied as industry itself and are adapted for a wide range of usefulness in nearly every conceivable business.

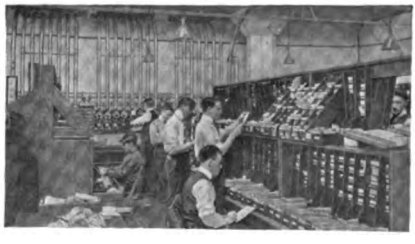
They carry practically everything that is ordinarily handled—from papers, currency and the most fragile products, to boxes, barrels, tools, castings, machine parts, etc.

No matter what the business is Lamson conveying systems will *save time and expense* and enable the organization to perform *more work with less effort.*

Lamson Service:

Specialists employed by this company are constantly solving all kinds of conveying and carrying problems, and their experience and service are at the disposal of those who desire a satisfactory solution of their conveying needs.

Full information covering any problem to which Lamson conveyors may be adapted will be furnished, without obligation.



In factories, labor and movement of materials are controlled through Lamson pneumatic tubes, which carry messages practically instantaneously.



Correspondence and important messages are quickly carried from office to office in the modern business house. Lamson pneumatic tubes are quicker and surer than messengers.

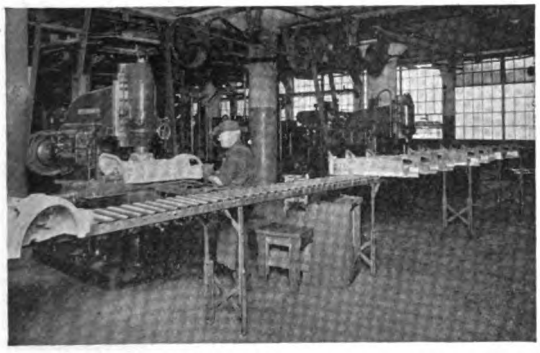


In the shop, work orders and material orders are received from the main office a few seconds after they are issued, through Lamson pneumatic tubes. Above picture shows typical installation.



Checks, debit and credit items, and all manner of papers are sent from tellers to bookkeepers in a few seconds by Lamson pneumatic tubes.

Digitized by Google



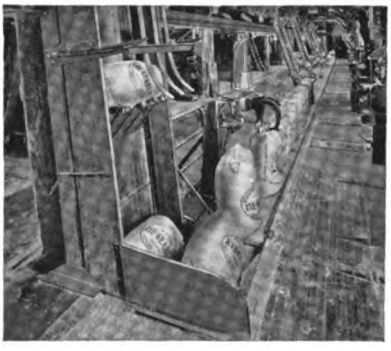
Gravity conveyors keep the stock moving between machines in the modern factory. Stock in process is kept down, and workmen are kept supplied continuously with material.



Lamson chain conveyors carry tote boxes of small parts quickly over long distances.



Two-way conveyor for quills in silk mill. This type of conveyor is admirably adapted for carrying all kinds of small articles in manufacturing plants.



Bags of flour and irregular shaped articles are easily carried by Lamson conveyors. Picture shows horizontal belt conveyor delivering to vertical conveyor.



Picture shows modern manufacturing plant completely equipped with Lamson gravity conveyor system. Finished products from all parts of the room go by way of the two-way conveyors to the inspection and shipping department. Workmen are constantly supplied with work, while finished work is carried away at once, and does not accumulate in aisles and at machines.

Digitized by Google

STANDARD CONVEYOR CO.

Formerly Minnesota Manufacturer's Association

NORTH ST. PAUL, MINN.

Chicago, Ill., 549 West Washington St.
Cincinnati, Ohio, 1208 Mercantile Library Bldg.
Cleveland, Ohio, 1014 Citizens Building
New York, N. Y., 227 Fulton St.
Milwaukee, Wis., 606 Security Bldg.
Kansas City, Mo., 308 Gumbel Bldg.

Representatives in all Principal Cities

Manufacturers of Gravity Roller Conveyor, Automatic Straight Lift Elevator, Inclined Elevator, Gravity Spiral Chute, and Power Conveying Machinery for the Indoor Transportation of Boxed, Cased, and Packaged Merchandise

STANDARD GRAVITY ROLLER CONVEYORS:

Are constructed of 2½" dia. either steel or maple rollers; ball-bearing, side frames of 2½" x 2" x $\frac{3}{16}$" angle iron.



Portion of Indoor Transportation System

This type of conveyor placed on 4% grade, conveys by gravity boxed and cased merchandise, lumber, brick, pig iron, and all commodities having one hard smooth surface to rest on the rollers.



Conveying Castings to and from Machine Operators on Standard Roller Conveyor

STANDARD GRAVITY SPIRAL CHUTES:

Are constructed on a scientific basis, permitting commodities of various forms, sizes, and weights to be lowered at a uniform rate of speed.

Standard Spiral Chutes are used for the economical lowering of merchandise from upper floors to lower floors.

STANDARD COMBINATION SYSTEMS:

Are comprised of Standard Gravity conveyor sections, Gravity spiral, automatic inclined power elevator, or power slat conveyors.

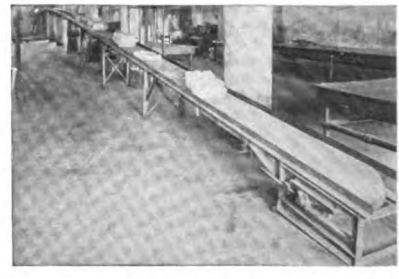
The combination of these units makes an ideal indoor transportation system reaching every part of warehouse, yard, or plant.



Standard Gravity Spiral Chute Lowering General Merchandise



Standard Combination Gravity and Power Slat Conveyor System



Conveying Bundles of Newspapers on Standard Belt Conveyor

WHATEVER—WHEREVER your conveying or handling problems are, there is a Standard Service at your command.

Experienced and practical engineering knowledge is back of every lay-out, drawing, or design submitted by our conveying efficiency engineers.

Digitized by Google

Elevating, Conveying and Power Transmitting Machinery

WELLER MANUFACTURING COMPANY

GENERAL OFFICE AND WORKS

1820–1856 N. KOSTNER AVE., CHICAGO

BRANCH SALES OFFICES

NEW YORK BOSTON BALTIMORE PITTSBURGH SAN FRANCISCO SALT LAKE CITY

Designers and Manufacturers of ELEVATING, CONVEYING AND POWER TRANSMITTING MACHINERY

for

Cement Mills, Stone and Ore Crushing Plants, Coal Handling Systems, Sand and Gravel Washeries, Fertilizer and Phosphate Mills, Grain Elevators and Flour Mills, Cotton Oil and Cotton Mills, Starch and Glucose Factories, Tanneries, Brickyards, Glass Plants, Canneries, Paper Mills, Sugar Plants, etc.

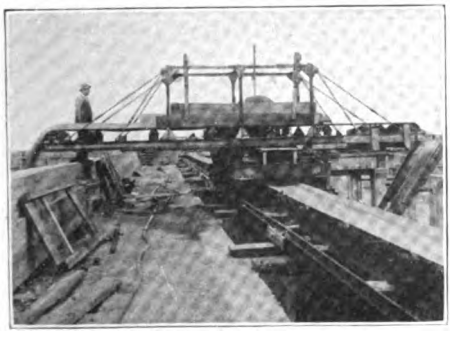
CATALOGUE SHOWING EQUIPMENT YOU ARE INTERESTED IN SENT ON REQUEST

WELLER MADE CHICAGO



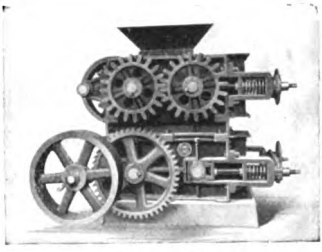
BELT CONVEYORS

For coal, stone, gravel, ore or any other loose material regularly made from 12 to 60 inches wide Belt Conveyor Catalogue on request.



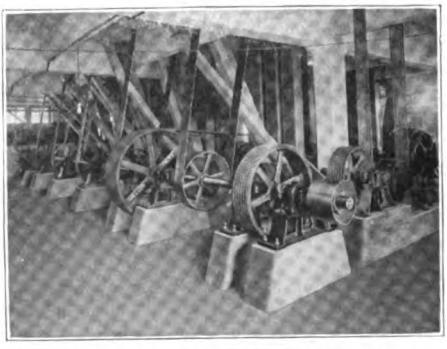
SHUTTLE TRIPPER FOR BELT CONVEYOR

Arranged to spread materials on either side of main belt conveyor. We have built this tripper with a spread of 120 ft.



COAL CRUSHERS

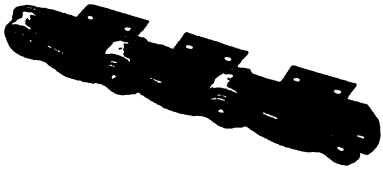
One, two and four rolls



HEAVY LINE SHAFT EQUIPMENT

Rope drives, etc. Transmission Machinery Catalogue on request.





WELLER-MADE CHAIN

We make steel and combination steel and malleable iron chain with all styles of attachments for elevating and conveying purposes. If interested send for Chain Catalogue.

Digitized by Google

THE BAKER R & L COMPANY

CLEVELAND, OHIO

Manufacturers of Baker Industrial Tractors and Trucks and Raulang Bodies

DESIGN AND CONSTRUCTION:

All parts are ruggedly constructed to meet the most severe usage. Every part has been specially developed for its particular service by engineers who have been building electric vehicles for more than twenty years.

INTER-STANDARDIZATION OF PARTS:

98% of all parts on all models are identical and interchangeable. This reduces manufacturing costs and stocks of spare parts. In emergencies complete units may be transferred from one truck to another.

DUPLEX COMPENSATING SUSPENSION:

An exclusive feature of Baker Series C Tractors and Trucks, allowing for more flexibility in spring action, maintaining accurate alignment at all times between axle and frame and relieving springs and other parts of all driving strain.

BAKER INDUSTRIAL TRACTOR:



Rated drawbar pull 400 pounds, starting drawbar pull 1500 to 3000 pounds; two- or four-wheel drive, four-wheel steer. Speed 2 to 7 M. P. H. Will haul a trailing load of from 10 to 20 tons.

BAKER LOCOMOTIVE TRACTOR:

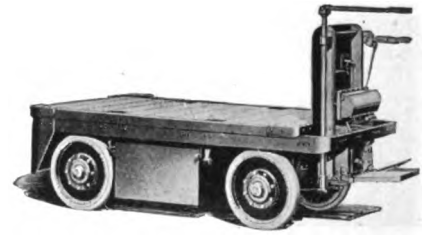
Rated drawbar pull 4000 lbs., starting drawbar pull 1000 lbs.; four-wheel drive. Speed 2 to 7 M. P. H., 24 to 36-inch gauge. Trailing load from 10 to 20 tons.

BAKER ELEVATING TRUCK:



4000-pound capacity load-carrying truck of elevating platform type, electrically driven, two-wheel drive, four-wheel steer. An auxiliary electric motor elevates and lowers the load platform 4½" in 10 seconds.

BAKER UTILITY TRUCK:



4000-pound load-carrying truck, electrically driven, two- or four-wheel drive, four-wheel steer.

BAKER LIGHT UTILITY TRUCK:

4000-pound load carrying truck, electrically driven, two-wheel drive, four-wheel steer. Of same capacity and assembled from same parts as standard Utility Truck, but shorter and narrower, for operation in congested aisle-ways.

BAKER LOW PLATFORM TRUCK:

4000-pound capacity load-carrying truck, electrically driven, two-wheel drive, four-wheel steer.

BAKER CARRYING CRANE:

4000-pound capacity; both truck and hoist driven by separate electric motors.

BAKER SWIVEL HOIST TRUCK:



Truck capacity 4000 pounds, hoist capacity 1000 pounds or 1500 pounds; truck and hoist both electrically driven by separate motors.

BAKER JIB CRANE:

1500 pounds capacity. Both boom and load hoists are motor driven and separately controlled from the dash.

BAKER DUMP BODY TRUCK:

Capacity 1 yd. or 40 ft. side or end dump; truck electrically driven.

BAKER CHARGING TRUCK:

For annealing ovens in malleable iron foundries Complete specifications upon request.

Digitized by Google

AMERICAN HOIST & DERRICK CO.

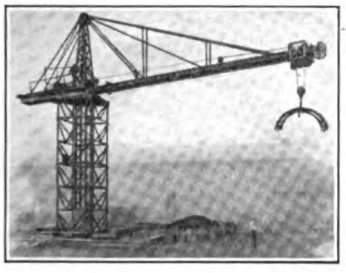
WORKS AND EXECUTIVE OFFICES: ST. PAUL, MINN.

BRANCHES

CHICAGO, 1113 Fisher Building
NEW YORK, 50 Church Street
NEW ORLEANS, 712 Union Street
PITTSBURGH, 2119 Farmers Bank Building
SEATTLE, 1512 L. C. Smith Bldg.

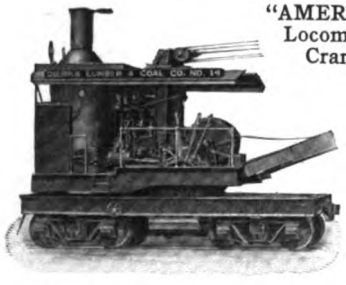
Manufacturers of Steam, Electric and Kerosene Hoists, Steel Storage Cranes, Locomotive Cranes, Derricks, Wire Rope Clips, Blocks, Etc.

"AMERICAN" Self-Supporting Steel Crane:

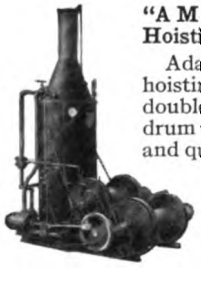


Especially valuable in locations where there is not enough room for a guyed derrick. Crane illustrated above is 3-ton type with 50-foot radius. Height from ground to boom is 35 feet 6 inches. Operated by 5½ x 8 engine, mounted on rear of boom which gives operator unobstructed view of work.

"AMERICAN" Locomotive Cranes:



Single piece gun-iron racer or revolving deck. Non-reversing, horizontal, double-cylinder hoisting engine. Turntable carried on 20 conical steel rollers working on a live ring, running in oil. Renewable steel roller paths. Highest grade fittings, steel canopy cab. "AMERICAN" friction clutches insure smooth operation. Simple lever system. Low center of gravity.



"AMERICAN" Steam Hoisting Engines:

Adapted to every kind of hoisting work. Single, double and triple friction drum types. Boilers ample and quick steamers. Brake and friction at opposite ends of drum. Independent winch heads. Everything accessible.

"AMERICAN" Steel Stiffleg Derricks:

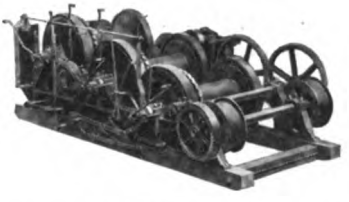


Excellent for permanent installations. Strength of built-up steel members can be figured with accuracy. Mast, boom and stifflegs of structural steel, built up to develop the full strength of the material and obtain maximum stiffness.

Boom swings through 270 degrees. Bull wheel furnished unless otherwise specified. Sheaves have bronze bushings, run on centerbored axles, lubricated from compression grease cups.

"AMERICAN" Derrick Electric Hoists:

Two friction drums for hoisting. Two reversing drums for slewing. Counterweight drum for grapple work, one winch head. Automatic roller ratchet brake prevents accident if current is suddenly shut off. Designed to meet all requirements.



Genuine "CROSBY" Wire Rope Clips:

Drop forged steel—high steel wings—broad grooved base, galvanized. Most dependable wire rope clip on the market. Cheapest because safest. None genuine without "CROSBY" imprinted on base.



Owing to the brief space, no attempt at detailed description has been made. Complete information upon request.

Digitized by Google

THE CONNELLSVILLE MANUFACTURING & MINE SUPPLY CO.

CONNELLSVILLE, PA.

Manufacturers of Pumping and Hoisting Machinery, Mine Fans and Cages, Skips, Slate Larries, Sheaves and Drums. Complete Equipment for Coal and Coke Works. Brass and Iron Castings.



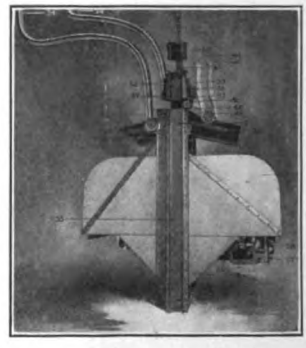
500 H.P. electric, single herringbone gear reduction, single friction drum haulage hoist with drum capacity to wind 10,000 ft. of 1⅛" wire rope, equipped with automatic slow-down and stop, and automatic lowering speed control appliances



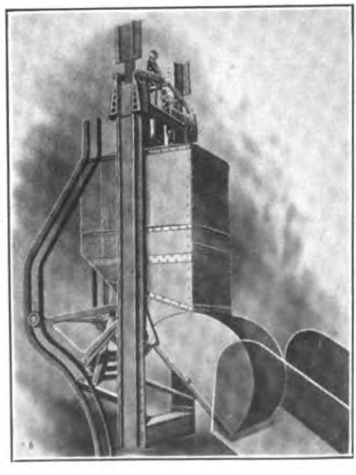
700 H.P. electric shaft hoist with double cylindro-conical drum, single reduction herringbone gears, and complete automatic mechanical control system



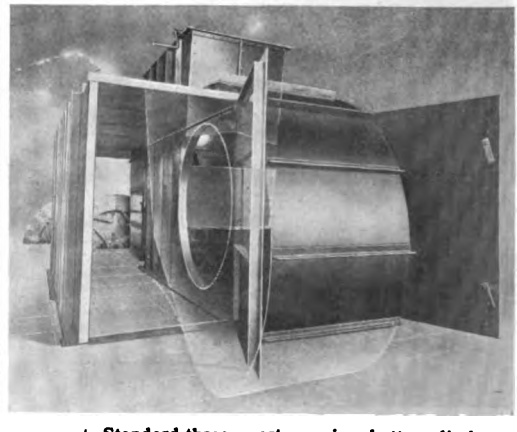
22" x 36" double drum, steam shaft hoist engine equipped with slow-down and stop mechanism and all of our standard safety appliances



Standard self dumping safety cage, showing tipping and locking guides and standard automatic safety wedges



8 ton bottom automatic discharge skip in unloading position



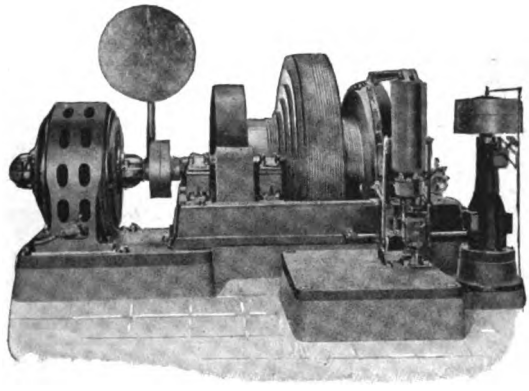
Standard three-quarter casing, bottom discharge, reversible mine fan with arched cut-off

Digitized by Google

OTTUMWA IRON WORKS, INC.

OTTUMWA, IOWA

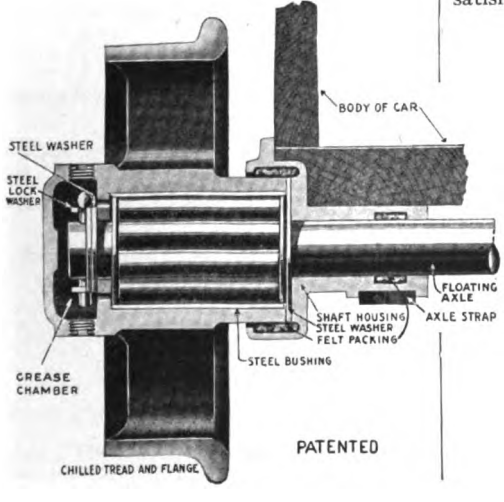
Designers and Manufacturers of Electric and Steam Hoists, Gravity Planes, Patent Roller Bearing Trucks, Mine Cars and Mine Equipment



ELECTRIC MINE HOISTS:

Our high efficiency hoists often save a motor generator set, usually reduce the size of motor and always consume less power than other types of electric hoists.

The cut shows a unit which hoists three two-ton cars per minute from 467′ depth using 400 HP. motor and consuming less than 1¼ K.W.H. per trip.



ROLLER BEARING CAR WHEELS:

In the manufacture of our Patent Roller Bearing Car wheels, we produce not only a high grade wheel, but also a mechanically correct roller bearing.

We guarantee our trucks to give satisfactory service and that on a level track the wheels will run with half the draw bar pull of any old type wheel.

They only require greasing once or twice a year.

We also manufacture mine cars to customers specifications using only the best grade material for the purpose.

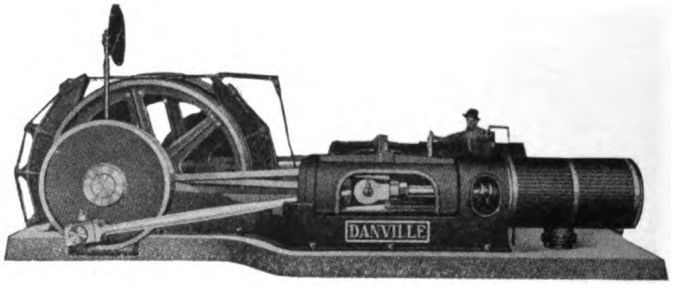
Digitized by Google

ROBT. HOLMES & BROS., INC.

Successors to Danville Foundry and Machine Co.

DANVILLE, ILLINOIS, U. S. A.

Builders of Coal Handling Equipment



"DANVILLE" HOISTS:

386 "Danville" hoists are constructed in a large variety of designs and types to meet most any hoisting condition.

Twenty-five years spent in the development and perfection of hoisting engines plus the most painstaking workmanship and careful selection of materials used—all these combined make the "Danville" what it is today—"Dependable." Constant safety for your men, always, and continuous operation at your mine are yours if you rely on "Danville Hoists." Reduced operating costs result from the detailed care given each part of every "Danville Hoist." Let us tell you more about them and mail you catalog.

SHEAVE WHEELS:



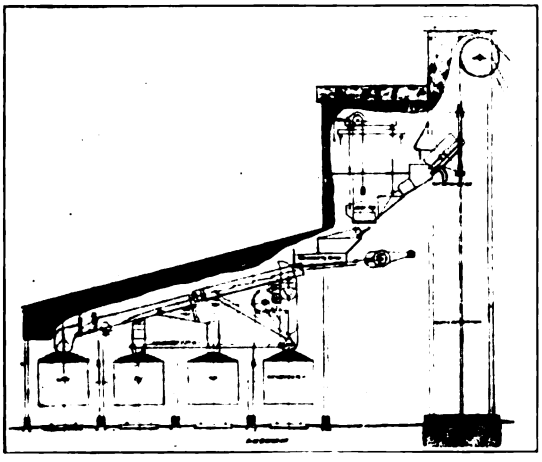
We cannot say too much for our sheaves. The good work they are doing speaks louder than words. Our steel-lined wheels are as perfect as they can be made.

Made in all sizes as shown above

Digitized by Google

ROBT. HOLMES & BROS., INC. DANVILLE, ILL.

HOLMES TIPPLE EQUIPMENT:



HEAVY DUTY MINE CAGE:



THE HOLMES HEAVY DUTY MINE CAGE "HALBERT TYPE"

We show here our four track tipple construction, with arrangement of HOLMES tipple equipment.

ADJUSTABLE LOADING CHUTE:

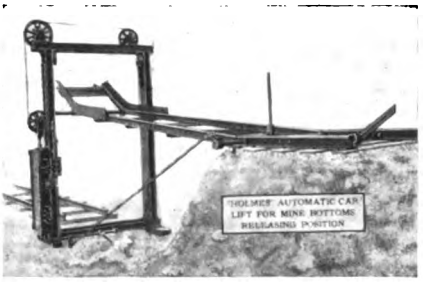


Our HELICAL ADJUSTABLE LOADING CHUTE. Our way is the right way. Let us tell you more about this chute.

It has no equal.

Made in both light and heavy duty types.

AUTOMATIC CAR LIFT:



The machine shown above is just what its name implies. It automatically takes care of the empties at mine bottom, doing away with all unnecessary help. Let us mail you catalog and detailed prints on this lift. There are no others

Digitized by Google

LIDGERWOOD MANUFACTURING CO.

MAIN OFFICES, 96 LIBERTY ST., NEW YORK, N. Y.

BRANCH OFFICES

CHICAGO, Fisher Building
SEATTLE, 65 Columbia Street
LONDON, ENGLAND
PITTSBURGH, Union Bank Building
PHILADELPHIA, Widener Building
LOS ANGELES, Central Bldg.

Manufacturers of Steam Hoisting Engines, Electric Hoists, Gasoline Hoists, Derricks, Cableways, Dredging and Excavating Machinery, Mine Hoists, Logging Machinery, Ship and Dock Winches, Steering Engines, Towing Engines

FOREWORD:

The Lidgerwood hoisting machinery of today embodies every improvement in design and construction developed by our 48 years' experience.

We design the complete machine to operate under the maximum service it is to perform, and build every part to meet the full working capacity of the machine.

Every part is accurately constructed upon the duplicate part system, insuring the absolute fitting of repair parts.

We have kept pace with the development of electrical engineering, and can supply our electric hoists equipped with the latest automatic control and safety devices, and type of motor best adapted for the work to be done by the hoist.

Our friction drum hoists have cork inserted friction woods. This increases the holding power of the friction and greatly reduces the power required to apply the friction. The entire friction mechanism is extremely simple.

STEAM, ELECTRIC AND GASOLINE HOISTS for all kinds of derrick service, including grab bucket work.

STEEL DERRICKS of all types; derrick fittings for wooden derricks.

PILE DRIVING HOISTS, pile driving frames and hammers.

HIGH SPEED BUILDERS' HOISTS for operating material and hod elevators.

STEAM AND ELECTRIC HOISTS designed for shaft and tunnel work, bridge erection and to meet every requirement of contracting work.

DREDGING AND EXCAVATING MACHINERY. Steam and electric bucket and swinging engines for operating both grab and scraper buckets on land and water outfits, both for dredging and for loading and unloading sand, gravel and coal barges.

Spud engines and cutter engines for suction dredges, built with special regard to the severe duty such machines perform.

STRAIGHT LINE CABLEWAY EXCAVATORS, steam or electric driven, with traveling towers, built in spans to meet service required. Operate drag scraper, or grab buckets. The high conveying speed enables them to excavate material rapidly and economically over wider areas than it is practicable to reach with the revolving type of excavator. Have handled 55 trips per hour, over a reach of 500 feet, using a three cubic yard scraper bucket.

CABLEWAYS: Lidgerwood cableways, steam or electrically driven to handle loads of from one to fifty tons, with spans up to 3,000 feet and with stationary or traveling towers. A prominent feature is the high speed fall rope carrier.

MINE HOISTS for every character of incline haulage and mine shaft service. Steam hoists built up to 1000 H. P. and electric in any size, and fitted with complete control and safety appliances.

LOG HANDLING SYSTEMS: High speed ground and overhead log skidding systems.

RAPID UNLOADERS for unloading ballast cars.

CAR HAUL HOISTS.

INCLINE COAL HOISTS.

COAL TOWER BUCKET AND TROLLEY HOISTS.

SHIPS' CARGO AND DOCK WINCHES. Steam and electric; a type designed for each method of cargo handling.

STEERING ENGINES of all types.

TOWING ENGINES. Maintain a constant stress on hawser.

Catalogs upon request. Engineering staff at your service.

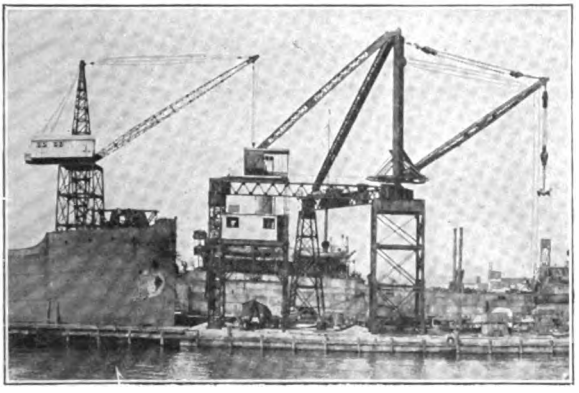
SEE OUR ADVTS IN MECHANICAL ENGINEERING THE JOURNAL OF THE A.S.M.E.

Digitized by Google

TERRY MANUFACTURING COMPANY

GRAND CENTRAL TERMINAL, NEW YORK CITY

Manufacturers of Material Handling Equipment



Hinged Boom, Revolving, Traveling Tower Cranes up to 50 Tons Capacity.

STIFF LEG DERRICKS

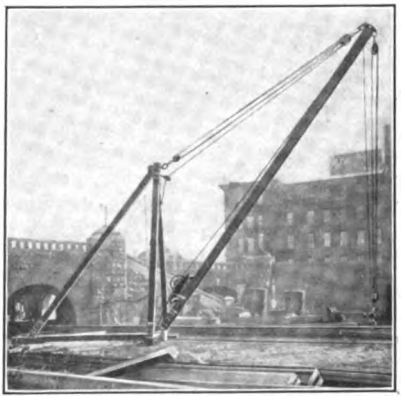
Steel and Timber

All Capacities

up to 150 Tons.



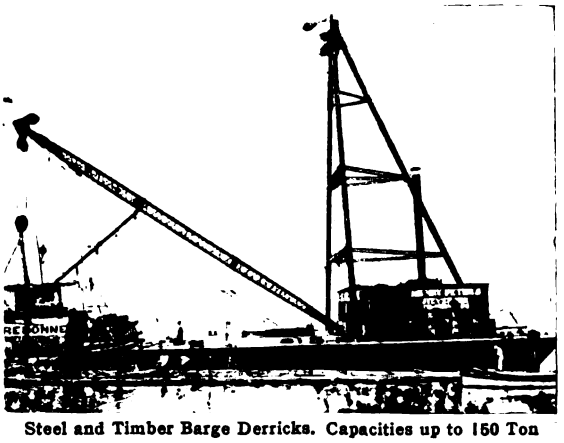
Steel and Timber Guy Derrick Capacities up to 50 Tons



Jinniwinks
2-3-5-6 Ton Capacities

We welcome the working out of material handling problems.

Derrick Irons, Tackle Blocks and fittings for timber derricks carried in stock.



Steel and Timber Barge Derricks. Capacities up to 150 Ton

Digitized by Google

THE BROWN HOISTING MACHINERY CO.

CLEVELAND, OHIO

NEW YORK: 50 Church St. PITTSBURGH: Oliver Bldg.
CHICAGO: 208 S. LaSalle St. SAN FRANCISCO: Monadnock Bldg.
NEW ORLEANS: Whitney-Central Bldg.

Engineers and Manufacturers of Locomotive Cranes, Heavy Dock Machinery, Bridge Cranes, Etc., as well as smaller Cranes and Hoists

COAL AND ORE HANDLING MACHINERY: BROWNHOIST

Bridge tramways, fast plants, cantilever cranes, gantry cranes, furnace hoists, larries, transfer cars, bins, car tipples, and pig iron breakers. These machines are designed for the rapid handling of material and a long service. They are installed in many parts of the world.

LOCOMOTIVE CRANES:

Eight- and four-wheel and for any gauge track; also built on Brownhoist Creeper Trucks or traction wheels; speediest locomotive crane built; equipped with M. C. B. couplers, standard trucks and fittings, steam brake, all steel gears; can be fitted with either a bottom-block, any kind of bucket, shovel attachment, magnet or piledriver, all interchangeable in a short time; easily operated; fitted with steam or electric power or with an internal combustion engine.

BUCKETS:

Grab buckets; drag line buckets; contractors' clam shell buckets; slag buckets; and tubs. The designs of these buckets are such that they get a full load each time and are under the control of the operator at all times. The best of material is used throughout, giving strength and durability to the spades, bearings, and digging edges.

TRAMRAIL SYSTEMS:

These systems handle all the material overhead, reaching every floor in each building and as much yard space as desired. We install the systems complete, using the well-known Brownhoist trolleys, which are recognized as the standard trolleys. Operated by electric or hand power.

OVERHEAD HAND TRAVELING CRANES:

Furnished in various capacities and spans. Built for easy operation, safety, and low headroom. They are easily and quickly erected. Prompt shipment can be made. Operated with hand hoist, air hoist, or electric hoist.

FREIGHT HANDLING EQUIPMENT:

This includes several different machines designed for handling the freight at a much reduced cost over the present methods. The freight is handled overhead from car to sorting platform, warehouse, wagon or other cars. It requires just a few men, eliminates confusion and costly mistakes, and increases the terminal capacity.

CONCRETE REINFORCEMENT:

Ferroinclave is a patented corrugated sheet steel used as a reinforcement for concrete. It requires no forms during erection, and is easily laid by the workmen. It is used for concrete roofs, floors, bins, walls, partitions, silos, bridges, stairs, etc.

We also make power scraper shovels, work-car cranes, jib cranes, pillar cranes, bridge cranes, crabs, winches, transfer tables, and water-closet shields.



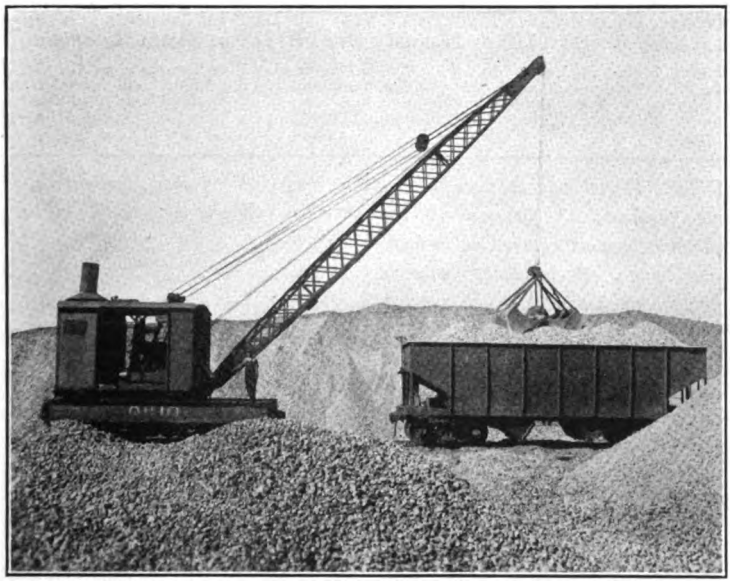
Catalogs and Prices Furnished on Request

Digitized by Google

OHIO LOCOMOTIVE CRANE CO.

GRACE ST., BUCYRUS, OHIO

Manufacturers of Locomotive Cranes



Twenty ton, eight-wheel, fifty ft. boom OHIO locomotive crane equipped with 1½ cu. yd. clam shell bucket. This is one of fourteen OHIO cranes owned and operated by the Standard Slag Co.

OHIO LOCOMOTIVE CRANE:

Ohio Locomotive Crane Co. is the only concern in the country today, devoting its time and attention exclusively to the manufacture of locomotive cranes. OHIO locomotive cranes are built complete in our own plant, consequently, every manufacturing operation is under our direct supervision, resulting in a finished product of superior type.

OHIO cranes can be operated by steam, electricity, compressed air or oil engines and can be furnished in capacities ranging from 15 to 50 tons. They can be equipped with a bucket for handling sand, gravel, crushed stone, slag, coal, sugar beets, ore, dirt, etc.; with a generating set and lifting magnet for handling scrap iron, castings, bars, etc.; with a dragline bucket or steam shovel attachment for rapid excavation; with a fall block and hook for all general hoisting purposes with pile driving attachments for driving pile and can be used as a switching engine.

Catalogue describing Ohio Locomotive Cranes furnished upon request.

Digitized by Google

INDUSTRIAL WORKS

BAY CITY, MICH.

BRANCH OFFICES: 50 Church St., NEW YORK, Widener Bldg., PHILADELPHIA, McCormick Bldg., CHICAGO and Book Bldg., DETROIT

Builders of Locomotive, Erection and Wrecking Cranes; Gasoline Coaling Cranes; Gantry Cranes; Pillar Cranes; Transfer Cranes; Pile Drivers; Transfer Tables; Portable Rail Saws; Grab Buckets; Lifting Magnets; and Pile Driver Steam Hammers

AGENTS: J. G. Miller, St. Louis, Mo.; C. B. Davis Engineering Co., Birmingham, Ala.; N. B. Livermore & Co., San Francisco, Cal.; Landes & Co., Denver, Colo.; and Salt Lake City, Utah; El Paso Bridge & Iron Co., El Paso, Texas; Northwestern Equipment Co., Portland, Ore., and Seattle, Wash.; F. H. Hopkins & Co., Ltd., Montreal, Canada, and Toronto, Canada; Copeland & Klingel, Minneapolis, Minn.

INDUSTRIAL WORKS was founded in 1873 and "Industrial" Cranes of today are the development of over forty-eight years' experience. Satisfactory service under widely varied conditions of service has proved that they are fundamentally correct in design, sturdy in construction and efficient in operation. In size they range from 2-ton hand operated cranes to wrecking cranes of 160 tons capacity.

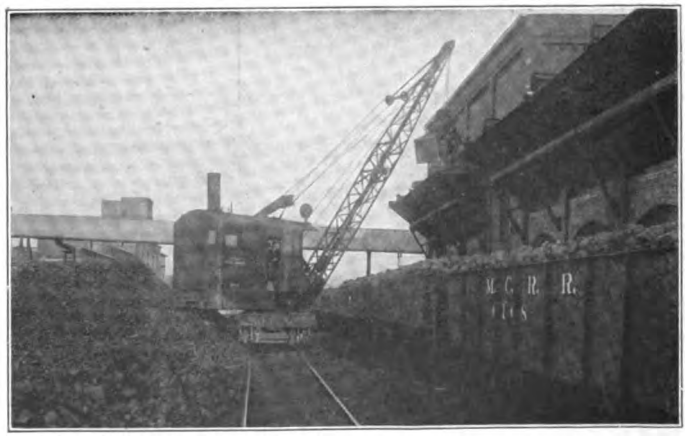
LOCOMOTIVE CRANES:

392

"Industrial" Cranes, steam, gasoline or electrically operated, are made in capacities of from 5 to 160 tons, and with booms from 20 to 140 ft. long. They are mounted on four- or eight-wheel cars for standard or special gauge track, or on boats or gantries. Being self-propelling they can switch several loaded cars.

These cranes may be used with grab buckets, hook and block, lifting magnets, or arranged for operating with a drag-line bucket, pile-driver leads or a steam-shovel dipper arm.

Mechanically, "Industrial" Cranes are not excelled. Every essential part of the entire crane is made, assembled and tested in our own extensive shops. All parts of the crane are accessible for easy examination, a large man being able to pass through the machinery part and car to the ground. Absolute interchangeability of parts is assured by the use of jigs and templates at every possible point in the construction. Inconvenient bearings are lubricated through oil pipes. The propelling gears on 8-wheel cars are placed in or out of mesh from the outside of the car body. For clam-shell bucket work, both drums are independent and the auxiliary take-up drum for the holding line is automatic in its action, requiring no attention from the operator.



A FLEXIBLE SYSTEM

Coal may be handled with the crane:

1. From cars to bunkers.

2. From cars to stock pile.

3. From stock pile to bunkers.

Digitized by Google

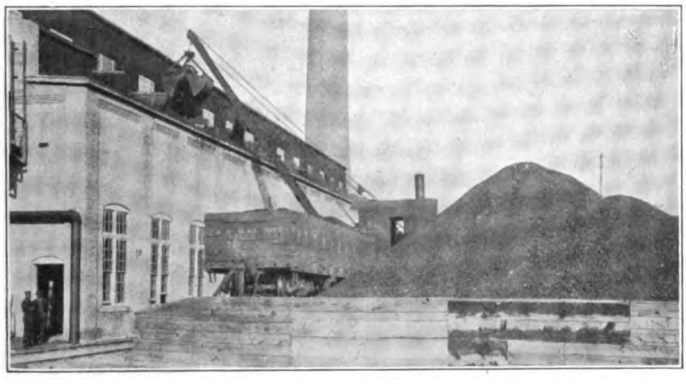
INDUSTRIAL WORKS — BAY CITY, MICH.

CHART OF MAXIMUM RADII IN FEET FOR BUCKET OPERATION
Crane Operating without Outriggers or Blocking

This chart contemplates use of maximum boom lengths as shown and would be subject to slight change if other lengths of boom are used. If special conditions involved are not covered by this chart consult with us.

Weight of coal used, 1400 lbs. per cubic yard
Weight of sand used, 3200 lbs. per cubic yard

Capacity in Yards		Power Wheel								High-Power Scraper								Multi-Power			
		¾ Yd.		1 Yd.		1½ Yd.		2 Yd.		¾ Yd.		1 Yd.		1½ Yd.		2 Yd.		1½ Yd.		2 Yd.	
	Max. Boom L'gth	Coal	Sand	Coal	Sand	Coal	Sand	Coal	Sand	Coal	Sand	Coal	Sand	Coal	Sand	Coal	Sand	Coal	Sand	Coal	Sand
Type "A"	27'–6"	20	17																		
Type "C"	45'–0"	42	36	39	32	32	26			38	33	35	30	31	25			31	25		
Type "EA"	50'–0"	50	49	50	44	44	35			50	44	47	40	42	34			42	33		
Type "G"	60'–0"	60	52	56	47	47	37	40	32	55	48	50	43	45	36	40	32	45	36	38	32
Type "H"	70'–0"	63	55	59	50	50	42	44	35	57	51	54	46	49	41	45	35	48	40	43	35
Type "KA"	70'–0"	63		67	58	58	47	51	41			61	53	56	46	51	41	55	46	49	34
Type "L"	70'–0"			70	62	62	51	55	44			66	58	61	50	56	45	60	50	53	43



Direct from Car to Overhead Bunkers

Data:

In general all sizes of locomotive cranes do the same kind of work, the amounts being limited, of course, by their capacities. The 60-ton capacity cranes are used chiefly for erection purposes; those from 20 to 40 tons for erection work or for handling large quantities of material with a bucket or magnet; cranes from 5 to 20 tons are general purpose machines, and are in general use for all kinds of loading and placing of material.

Locomotive cranes are usually rated according to their maximum free capacity at the minimum radius (about 12 ft.). The table gives the approximate radius in feet at which various size cranes will handle clam-shell buckets full of coal and sand. (A 1½-cu. yd. bucket holds approximately one ton of coal.)

To unload material with a grab bucket from the far end of a modern gondola car standing on the same track as the crane requires a 50-ft. boom. In general, the shorter the boom, the easier and faster will be the operation of the crane.

WRECKING CRANES:

"Industrial" wrecking cranes have been standard since 1883. Built in capacities of 75, 100, 120, 150 and 160 tons.

Member of Material Handling Manufacturers' Association.

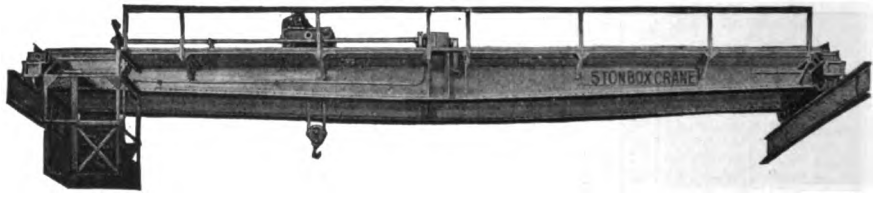
Digitized by Google

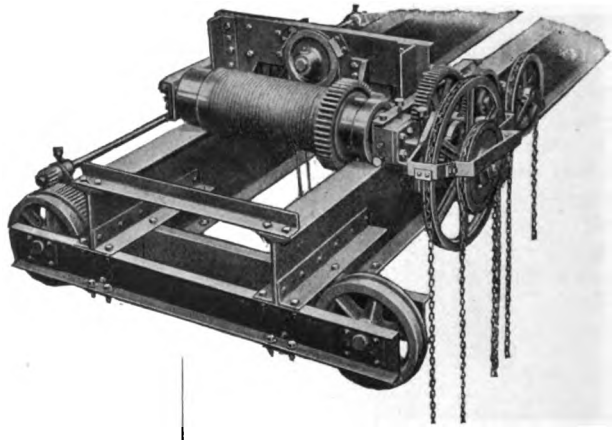
ALFRED BOX & COMPANY, INC.

Established 1878

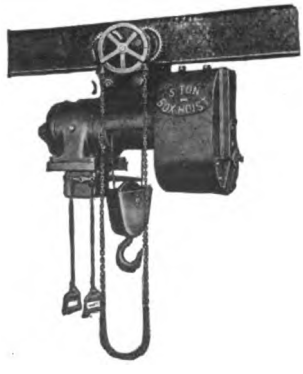
PHILADELPHIA, PA.

Electric Traveling Cranes, Jib Cranes, Bucket Cranes, Hand Traveling Cranes, Monorail Systems, Electric Hoists, Trolleys, Chain Hoists and Electric Winches





Manufacturers since 1878 of hoisting machinery exclusively. Our line of standard equipment and the many special designs we have built to meet special conditions and the experience gained in over 40 years in this line fits us particularly to take care of any hoisting problem that may arise.



OUR STANDARD LINE COMPRISES:

Electric Travelers to 60 tons capacity

Hand Power Travelers to 50 tons capacity

Jib Cranes of all descriptions

Electric Hoists from ½ to 15 tons and all possible combinations

Chain Hoists and I-Beam Trolleys

We shall be pleased to send bulletin showing our complete line.

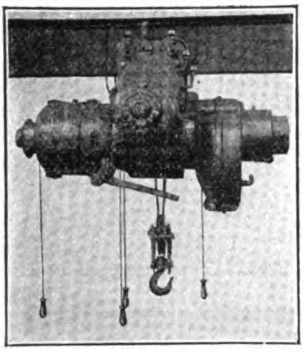
"Box Cranes are built with the experience of years."

Digitized by Google

MARIS BROS., INC.

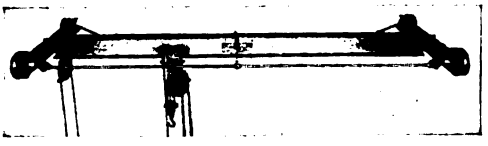
5546 GRAYS AVENUE, PHILADELPHIA

Manufacturers of Cranes and Hoists



We build cage controlled cranes and also pulpit control.

Our electric hoist uses very low headroom and often saves a foot height on the whole building.



ELECTRIC HOISTS:

Capacity 500 lb. to 15,000 lb. Mounted on trolley to run on I-Beam, or on stationary base to mount on derrick mast, or elsewhere, as a winch. Trolleys may be propelled by pushing on load, by hand chain and gearing, or by electric motor. Very small headroom required.

HAND CRANES:

The illustration shows single beam which is very satisfactory up to 5 tons capacity and 40 ft. span. We advocate double beam cranes for the heavier loads and longer spans.

Either the single or double beam cranes may be equipped with electric hoists and we frequently make the bridge travel by electric motor in addition, thus making a 2 motor crane.

The former is illustrated below, handling two cans of ice. For plate ice factories, for street railway car shops, for ore milling plants and for other special requirements we build cranes with two hooks to suit the conditions.

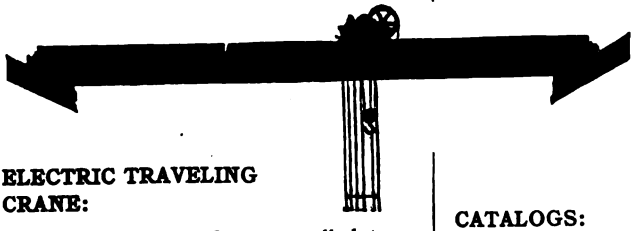
OVERHEAD TRACKS:

For either electric, or hand, hoists and trolleys we have a complete line of hangers, switches, turntables, and transfer cranes. Will reach every floor in the building, as much yard space as required, and run from building to building. In fact is very flexible and will reach every part of the plant.



ENGINEERING SERVICE:

Our expert engineers are ready to solve your hoisting problems. Thirty years experience, concentrated on hoists and cranes, fits us particularly to meet special requirements.



ELECTRIC TRAVELING CRANE:

Illustration shows floor controlled type. This has many advantages for power plants, sugar mills, paper mills or wherever heavy machinery requires repairing.

CATALOGS:

Write for complete catalogs. Let us know if possible what type of and what span capacity you are interested in.

Digitized by Google

NEW JERSEY FOUNDRY & MACHINE COMPANY

90 WEST ST., NEW YORK

Manufacturers of Overhead Carrying Devices

DELTA

ELECTRIC
AND
HAND POWER
TRAVELING CRANES

STATIONARY
SINGLE AND DOUBLE LEG
GANTRY CRANES

WALL CRANES

JIB CRANES

I-BEAM TROLLEYS

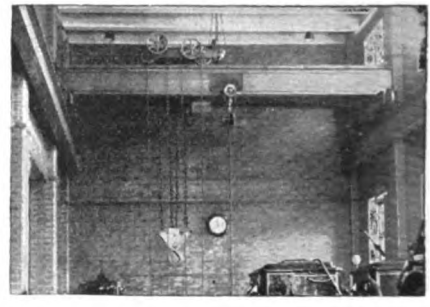
CRANE TROLLEYS

BEAM HANDLERS

SPECIAL CRANES









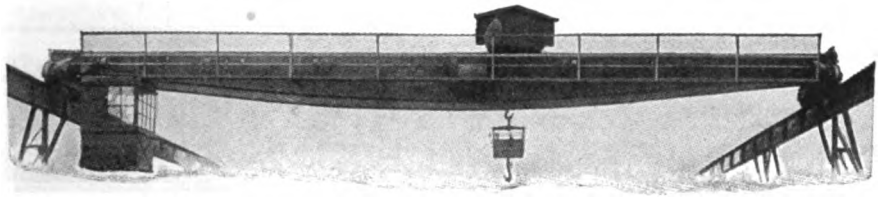


Digitized by Google

NORTHERN ENGINEERING WORKS

DETROIT, MICH.

Manufacturer of Electric Traveling Cranes, Electric and Hand Cranes of All Types, Hoists and Machinery



ELECTRIC CRANES AND HOISTS

NORTHERN CRANES

Northern Crane Products have been in use for over twenty years—**Northern Hoists** for nearly as long. In purchasing Northern Cranes or Hoists the buyer has behind his purchase an established firm of experience and responsibility. The designs have been kept up-to-date in both safety and convenience features.

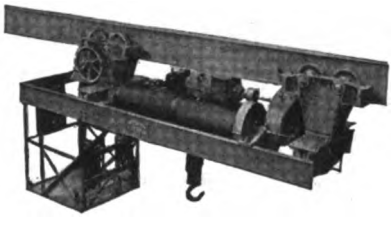
Good service is assured every purchaser.

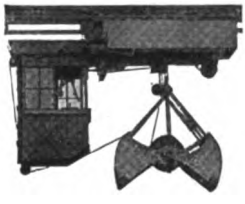
We make also
ELECTRIC HOISTS
AIR HOISTS

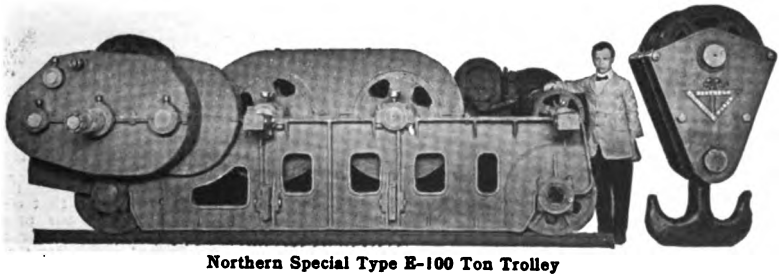
SEE OUR ADVTS IN MECHANICAL ENGINEERING THE JOURNAL OF THE A.S.M.E.

Catalogs and Bulletins free on request.









Northern Special Type E-100 Ton Trolley

Digitized by Google

PAWLING & HARNISCHFEGER CO.

GENERAL OFFICES AND WORKS: MILWAUKEE, WIS.

NEW YORK
PHILADELPHIA
NEW ORLEANS
PITTSBURGH
CHICAGO
SAN FRANCISCO
LOS ANGELES
SEATTLE

Manufacturers of Traveling Cranes, Hoists, Monorail Systems, Builders of Drilling and Boring Machines, Excavators, Backfillers, Tampers

P. & H. CRANES AND HOISTS:

Standard and Special Types:

Standard Overhead Electric Traveling Cranes 1–150 tons capacity
Mill Type Traveling Cranes
Open Hearth Charging Cranes
Grab-Bucket (operating) Electric Traveling Cranes
Gantry Cranes
Traveling Wall and Jib Cranes
Pillar Jib Cranes
Extension Cranes—Transfer Cranes
Hand Operated Traveling Cranes
Traveling Electric Hoists
Complete Monorail Systems
I-Beam Trolleys

P & H have built cranes, hoists and heavy machinery for over thirty-six years on the principle that heavy machinery should receive the same exacting care in building and the use of the same fine materials in fabrication as machinery intended for more precise work. The P. & H. Crane or Hoist is a well finished machine, destined for a maximum of unremitting service and dependability.

398



To purchase a standard crane its consideration must begin when the structural plans are being drawn; the building can then be "made to order" for the crane if you would eliminate the costly and time-consuming process of adapting a crane to the structure.

The selection of the type of crane should depend upon the exact conditions under which it will be operated and the specific function to be discharged. In this regard it cannot be too strongly emphasized that the recommendations of our engineers, which are based on their knowledge and experience, should be given careful consideration; their services are at your command.

Hoists:

P. & H. Electric Hoists fall into two classes—floor-controlled and cage-controlled.

The Type U Hoist is the floor-controlled type.

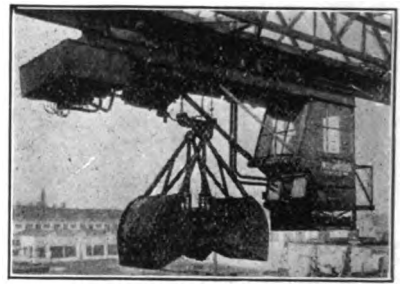
The Type O and Grab Bucket Hoists are cage-controlled types.

The Type U Hoist travels on the lower flanges of a standard I-Beam.

Travel is of Three Types:

(1) Hand operated by pushing on the suspended load.
(2) By chain and wheel.
(3) By a separate motor drive.

Type U Hoists can be applied to traveling cranes, jib cranes, wall cranes, I-Beam Monorail Systems, and are built in a wide range of lifts and capacities. The floor-controlled hoist is most useful where hoisting and lowering are the principal requirements and conveying distances



limited. Where materials have to be conveyed considerable distances the cage-controlled hoists are necessary. They can be operated over a flexibly laid out Monorail System both inside and outside the plant buildings. Hoisting, lowering, and travel control is exercised from the hoist cage. Handling bulky units and loose materials is the particular province of the cage-controlled hoist. Built in a wide range of capacities.

The following bulletins describe the P & H line of overhead equipment:

Bul. 401-B—Type H Standard Cranes.
Bul. 403—Mill Type Cranes.
Bul. 104—Electrical Equipment of Cranes.
Bul. 301-B—Type U Hoists.
Bul. 303—Type O Hoists
Bul. 304—Grab Bucket Hoists
Bul. 17-A—I-Beam Trolleys and Hand Cranes.



Having had use for machines capable of operating on bulky and odd parts in our own shops and being unable to get satisfactory apparatus outside, we built the P. & H. line of drilling and boring machines. We liked them so well and found them so convenient that we have placed them among the list of our products. If your production costs for drilling or boring are high P. & H. equipment will lower them.

Send for descriptive literature.

Digitized by Google

THE TOLEDO CRANE COMPANY

102 SANDUSKY ST., BUCYRUS, OHIO

Manufacturers of Electric Traveling Cranes and Hoists



TOLEDO CRANES:

"Toledo" standards guarantee, latest practice in design; positive engineering and accuracy; smoothness; speed, and power with flexibility and economy in operation.

Toledo Cranes are furnished in the standard overhead and gantry designs, also in special designs, for any service and in any span or capacity, alternating or direct current.

They are also furnished in the bucket type for the handling of all loose materials, capacities one to ten cubic yards.

MONORAIL HOISTS:

In addition to cranes we can furnish the heavy service type of monorail hoists, for either standard or bucket service, direct current only.

You are quite welcome to any information that we can furnish you.

Digitized by Google

SHEPARD ELECTRIC CRANE & HOIST COMPANY

NEW YORK
PHILADELPHIA
PITTSBURGH
CHICAGO
SEATTLE
GENOA

MAIN OFFICE & WORKS
MONTOUR FALLS, N. Y.

DETROIT
PARIS
CINCINNATI
STOCKHOLM
CHRISTIANIA
HAVANA

BALTIMORE
SAN FRANCISCO
MONTREAL
LONDON
BARCELONA
MELBOURNE

For Direct and Alternating Currents, Electric Hoists and Monorail Cranes in Capacities of 1/2 to 30 Tons; Electric Traveling Cranes 1 to 50 Tons; Transfer Cranes; Double Monorail; Track; Trolleys; Electric Back Geared Winches; Electric Cargo Handling Equipment for Docks and Ships

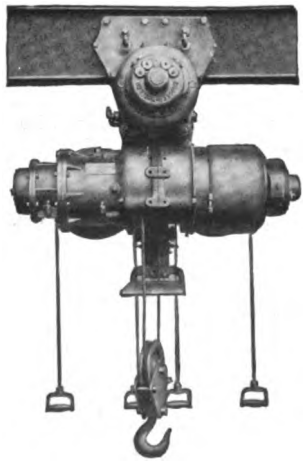
THE SHEPARD LINE IS COMPLETE:

SHEPARD Cranes and Hoists are handling materials in many and varied industries. The selection and extension of this equipment has been largely governed by the evident superiority of the design and the new standard of reliability in service which it has established.

SHEPARD Handbook—describing the complete line—will be sent on request. Write for it Now.

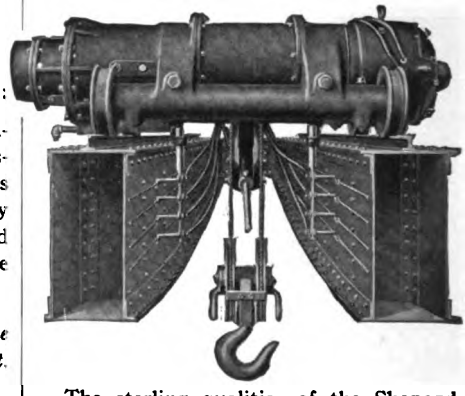
400

FORM 1 FLOOR CONTROL D. C. HOIST (with Motor Driven Trolley):



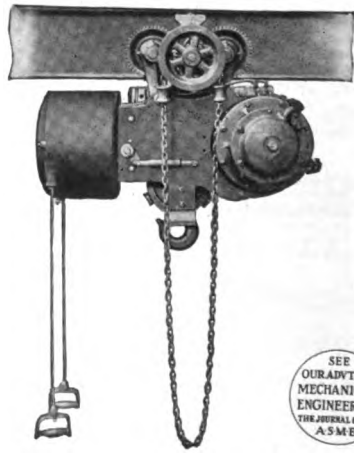
Especially useful where loads must be carried distances too long for the workmen to push them on the runway efficiently.

FORM 6 SHEPARD CRANE TROLLEY:



The sterling qualities of the Shepard Crane Trolley are secured by locating steel gearing and multiple discs within rigid cylindrical frames completely protected and completely protecting workmen.

FORM 23 HOIST (with Geared Trolley):



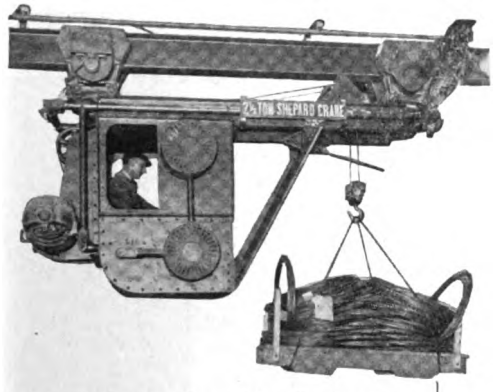
SEE OUR ADVTS. IN MECHANICAL ENGINEERING THE JOURNAL OF THE ASME

The use of this type of hoist permits hoist service in low headroom where sufficient lift could not be otherwise obtained.

Digitized by Google

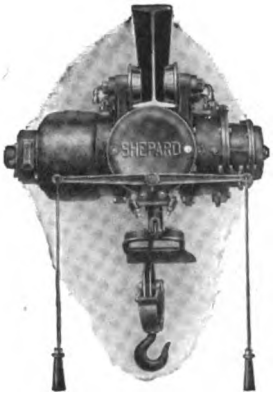
SHEPARD ELECTRIC CRANE & HOIST COMPANY
MONTOUR FALLS, N. Y.

FORM 24 CAGE CONTROLLED HOIST:

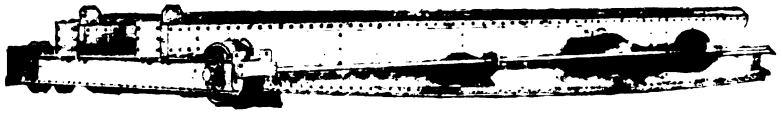


Where groups of small units in trays are to be handled, this type of hoist has decided advantages, particularly where there are curves in the I-beam runway. It can be supplied with two load hooks where long flexible loads are to be handled.

FORM 2 X S HOIST:

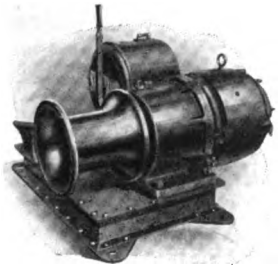


Light Capacity Hoist, for handling of loads just too heavy for one man.



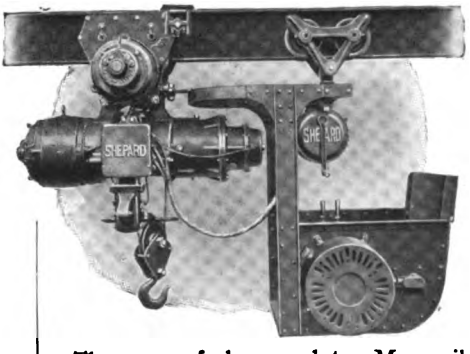
The Shepard idea of providing complete protection and automatic lubrication is carried throughout Shepard Cranes

FORM 36-W ELECTRIC BACK GEARED WINCH:



A compact, weather-proof winch with running parts completely enclosed and protected from all atmospheric conditions. Its uses are manifold in and about industrial plants.

FORM 25-3 MONORAIL HOIST:



The use of heavy duty Monorail Hoists with the flexibility of handling arrangements which transfer switches permit, revolutionizes handling methods in many industries. Can be enclosed for outdoor service.

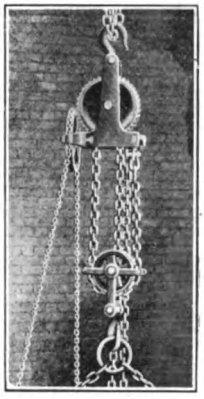
Digitized by Google

HERBERT MORRIS, INCORPORATED

1-15 LAWRENCE PLACE, BUFFALO, N. Y.

Manufacturers of Overhead Traveling Cranes, Jib Cranes, Overhead Runways, Chain-Blocks and Accessories

MORRIS CHAIN-BLOCKS:





Whatever your handling problem may be, there is a Morris hand-hoist to handle
402 the situation. Made in Worm-Gear, Spur-Gear, Triple-Gear, Differential and I-Beam Traveling types, the Worm-Gear type is also available with a gravity-lowering attachment when desired. Will take a load of from ⅛th long ton to 60 long tons, depending on the type selected and the service required. Their construction convinces the most critical and careful that they are safe and durable. Each hoist is tested before leaving the plant with a load 50% in excess of its rated capacity.

Your Chain-Block will be shipped the same day your order arrives.

MORRIS HAND-OPERATED CRANES:



Modern business now recognizes from experience that "manufactured" equipment is far superior to "built" equipment. Morris production methods of manufacturing cranes assures you a relatively cheap crane of the best materials—durable and safe—and where parts fail, due to natural wear, they come from our stock room—not a "makeshift" from the local blacksmith.



Made in the Overhead Traveling, Gantry and Jib types. There are 54 variations in stock from 2 to 30 tons and up to 50-foot span. Other capacities or spans made up almost as quickly.

As with all Morris products, each crane must undergo strict inspection of materials and workmanship and stand an operating test load 50% in excess of rating.

OTHER MORRIS PRODUCTS:

Electric Hoists

Electric Cranes

Friction Hoists

Telescopic Ash-hoists

Chain-winches

Chain-slings

Those concerns having branch factories in Canada will be assured good service and the best of lifting and handling machinery by placing their orders with our associated company, **THE HERBERT MORRIS CRANE & HOIST COMPANY, LIMITED** with Head Office and Works at **NIAGARA FALLS, CANADA.**

Send for Bulletins and Catalogues.

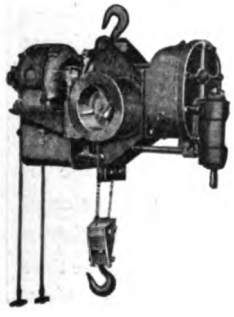
Digitized by Google

READING CHAIN AND BLOCK CORPORATION

MAIN OFFICE AND WORKS: READING, PA., U. S. A.

Manufacturers of Chain Hoists, Electric Hoists, Traveling Cranes

ELECTRIC HOISTS:



Direct or Alternating Current
Single or Variable Speed

Perfect Balance

Positive Automatic Limit Stop
Up and Down

Catalog No. 48

Multiple Gear

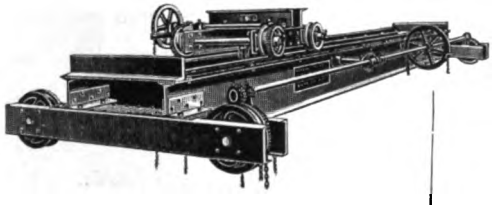
CHAIN HOISTS



¼ to 20 Tons
Capacity

For 20 Years
The CHAIN HOIST
Used by the
U. S. Government
and
Paper Trade

Catalog No. 47



TRAVELING CRANES:

Single and Double I-Beam
Double Girder
1-30 Tons Capacity
up to 100 Feet Span
Hand or Electric Power

Catalog No. 49

Differential

CHAIN HOISTS

¼ to 2 Tons
Capacity

Bulletin D-1



I-BEAM TROLLEYS

Plain or Geared

READING C AND B

PRODUCTS

Must Make Good—Or We Will

Digitized by Google

FORD CHAIN BLOCK CO.

SECOND AND DIAMOND STS., PHILADELPHIA, PA.

Manufacturers of the Ford Tribloc Chain Hoist, Screw Gear Hoists, Differential Hoists and Plain and Geared Trolleys

THE FORD TRIBLOC CHAIN HOIST:



The Ford Tribloc Chain Hoist is built in sizes and capacities from one-half ton up. It is equipped with a patented Loop Hand-Chain Guide which protects the working parts, keeps the chain from gagging, and enables you to operate the hoist from any angle. It has steel working parts, planetary gearing (which is enclosed in a dust-proof steel case), and a 3½-to-1 factor of safety in its weakest part. Eighty per cent of the power applied to the hand-chain of the Tribloc is converted into lifting energy.

404

ROLLER BEARING STEEL PLATE TROLLEYS:

We carry in stock, ready for immediate shipment, a line of Roller Bearing Steel Plate I-Beam Trolleys in all sizes, and in both the plain and geared types. Trolleys can be widened to suit larger than standard beams.

SCREW HOISTS:



(Duplex Type)

For work where the highest speed and efficiency are not required, we can furnish the Ford Duplex Type Worm Gear Hoist. This type of hoist is frequently preferred for portable use, as it is lighter in weight and at the same time powerful and durable.

DIFFERENTIAL HOISTS:



This is the simplest of all chain hoists, and where a hoist is required but occasionally and high efficiency and speed are not essential, it serves the purpose admirably. The Ford Differential Hoist is made with exceeding care and of the best material obtainable.

Send for a copy of our catalogue. It gives prices and goes into details.

PRICE LIST—TRIBLOC CHAIN HOISTS

Capacity in Tons	Price Complete	Regular Hoist in Feet	Extra Hoist Price per Foot	Net Weight in Pounds	Feet of Chain Handled to Lift Load One Foot
½	$70.00	8	$1.80	53	21
1	90.00	8	1.90	80	31
1½	120.00	8	2.00	124	35
2	140.00	9	2.10	188	42
3	180.00	10	3.00	200	69
4	220.00	10	3.20	290	84
5	280.00	12	4.30	380	126
6	330.00	12	4.30	390	126
8	400.00	12	5.40	470	168
10	480.00	12	6.50	570	210
12	600.00	12	8.60	800	126*
16	720.00	12	10.80	1000	168*
20	850.00	12	13.00	1375	210*
32 } 40 }	Prices and full particulars upon request. *For Each Hand-Chain.				

Digitized by Google

THE YALE & TOWNE MFG. COMPANY

STAMFORD, CONN.

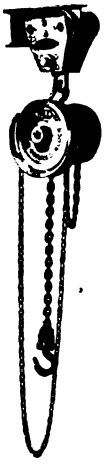
CANADIAN YALE & TOWNE, LTD., ST. CATHERINES, ONT.

Manufacturers of Yale Chain Blocks, Electric Hoists, Electric Industrial Trucks and Tractors, Padlocks, Night Latches, Dead Locks, Door Closers and Builders' Hardware

YALE

The Yale Hoisting and Conveying Systems include hand operated chain blocks in capacities from ¼ ton to 40 tons; electric chain and wire rope hoists in capacities from ½ ton to 10 tons; I-beam trolley systems; and electric storage battery industrial trucks, tractors and trailers.

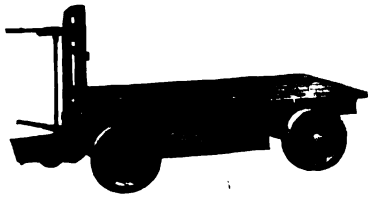
THE YALE SPUR-GEARED BLOCK:



The Yale Spur-Geared Block is a safe and speedy portable hand hoist for use where loads must be lifted frequently. Used with an I-beam trolley system or crane, it provides an efficient means of lifting and moving any material.

From hook to hook there is a line of steel; supporting hook, suspension plates, load sheave. load chain, detachable shackle and load hook, are all of the best grade steel, thus insuring the highest degree of safety.

YALE ELECTRIC TRUCKS: A-17 and B-17:



Flat platform, general utility trucks of 4000 lb. capacity. Type A-17 has platform area of 30 sq. ft. Type B-17 has platform area of 40 sq. ft.

For general use on steamship piers, in warehouses, and for various classes of interplant and yard service.

YALE ELECTRIC HOISTS:

Yale electric hoists of the chain or wire rope type are made in capacities up to 10 tons. The Yale electric chain hoist does the work of a hand-operated chain block, at from five to ten times the hoisting speed, and is safe if operated by unskilled labor. Each hoist is tested to 50% more than its rated capacity before it leaves the factory.



405

Other Yale Chain Blocks include the Screw-Geared and Differential types largely used for occasional service, requiring a light, portable hand-hoist.

YALE ELECTRIC CRANE TRUCKS:



Crane can be swung through an arc of 180 degrees. Hoisting motor is direct connected to worm and gear, and the grooved drum, actuating single hoisting chain. The boom may be raised while the load is being lifted. Capacity of crane 200 lb. to 1600 lb. Capacity of truck 4000 lb.

SEE OUR ADVTS. IN MECHANICAL ENGINEERING THE JOURNAL OF THE A.S.M.E.

Digitized by Google

GILLIS & GEOGHEGAN

Established 1866

543 West Broadway
NEW YORK

SHERBROOKE, QUEBEC,
CANADA

Agencies in Principal Cities throughout U. S. and Canada

Manufacturers of G & G Hoists for industrial uses, and a complete outfit for the removal of ashes, consisting of the G & G Telescopic Hoist, G & G Sidewalk Doors with Spring Guard Gates and Automatic Door Opening and Closing Device, G & G Swing Bail Hoisting Cans, and G & G Operator's Ladder

The G & G Telescopic Hoist

G & G Hoists are made in various standard models—*telescopic* and *non-telescopic*—*manually* and *electrically operated*. G & G Hoists are designed for *simple, safe, efficient* and *economical* raising and lowering of loads at Industrial Plants—such as Bags, Bales, Barrels, Boxes, Cans, Carboys, Ice, Parts of Machinery, Trays and other loads within their scope.

G & G Hoists are also designed for the removal of Ashes, Rubbish, etc. from factories and all other types of buildings where ashes accumulate rapidly.

MODEL E, TELESCOPIC HOIST operates electrically. That part of Hoist shown *telescopes* below grade when not in use. Motor 1½ h.p. totally enclosed (series wound for direct current, squirrel cage for alternating current), with brake, automatic upper limit and single speed controller. Hoist raises load of 500 lbs. at speed of 60 ft. per minute.

Lowers loads rapidly by gravity. MODEL A HOIST IS SIMILAR IN DESIGN TO MODEL E EXCEPT THAT IT IS *MANUALLY* OPERATED at speed of 30 ft. per minute for capacity load.



Model E, Telescopic Hoist, Electrically Operated, Installed in a Machine Shop

MODEL B, TELESCOPIC HOIST with Overhead Crane, operates manually. That part of Hoist shown *telescopes* below grade when not in use. Built to raise load of 300 lbs. at speed of 30 ft. per minute. For ash removal operator can raise load from cellar to position 6 or 7 feet above grade and empty cans directly into wagon or truck without rehandling at grade level. MODEL D HOIST IS SIMILAR IN DESIGN TO MODEL B EXCEPT THAT IT IS *ELECTRICALLY* OPERATED at speed of 60 ft. per minute for capacity load with independent motor in cellar.



Model B, Telescopic Hoist, Manually Operated

G & G Hoists can be installed in old or new buildings on any floor or in boiler room where there is an opening, preferably 4 feet square.

The G & G Hoist is compact, very easy to erect, no pit is required, and blue prints are furnished showing erection in detail. All parts are painted one coat except machined parts which are coated with grease. Every G & G Hoist is subject to working test before shipment.

WHERE USED:

The Riches Piver Co.'s Chemical Plant at Lyons Farms, N. J., uses a Model B Non-Telescopic Hoist for handling loads between top of truck or roadway and second story of building.

The Packard Motor Car Company now uses four G & G Hoists in its Detroit Plant.

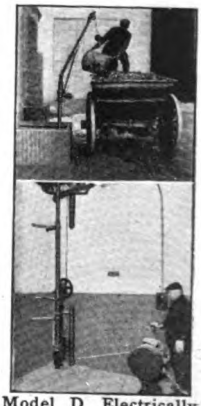
The Mergenthaler Linotype Co., Brooklyn, New York, uses a Model D electrically operated Hoist. As a result of test conducted by large electrical engineering concern, it was found that this Hoist under normal conditions averaged 78 cans of ashes raised and returned empty in one kilowatt hour.

Details of these and other industrial installations will be furnished to those interested.

The G & G Telescopic Hoist was investigated and approved March 24, 1915, and June 10, 1920, by Investigating Committee of Architects and Engineers. For prices and further description send for our complete catalog.



Model B Non-Telescopic Hoist used by Riches Piver Co.



Model D Electrically Operated Telescopic Hoist used by Mergenthaler Linotype Co.

Digitized by Google

SEDGWICK MACHINE WORKS

146 WEST 15TH ST., NEW YORK, N. Y.

TELEPHONE: WATKINS 9416 FACTORY: POUGHKEEPSIE, N. Y.

PRODUCTS:

Dumbwaiters, Hand Power Elevators and Gravity Lifts of all types for every condition where economical, vertical conveying is required.

ADVANTAGES:

Our hand power conveying equipment is the most efficient for a wide variety of uses as well as being the least expensive to install and maintain. Sedgwick Machine Works have specialized for more than twenty-five years in the hand power field with the result that Sedgwick outfits are superior in design, material and workmanship. Vertical transportation of materials upwards in large quantities usually demands power, but downward it is frequently more profitably accomplished by Sedgwick dumbwaiters, hand power elevators, or gravity lifts, depending on conditions.

USES:

It is safe to say that most manufacturing establishments occupying buildings of more than one story can profitably install one or more Sedgwick Hand Power Elevators, Dumbwaiters, or Gravity Lifts, frequently a large number. Our equipment is giving satisfactory service in the following lines of industry.

Cracker Bakeries, Sugar Refineries, Dyestuff Works, Hat Factories, Phonograph Factories, Silk Mills, Chemical Works, Powder Mills, Paper Mills, Creameries, Crematories, Soap Factories, Printing Plants, Varnish Manufactories, Ink Manufactories, Rubber Goods Manufactories, Clothing Factories, Shoe Factories, Gas Plants, Pharmaceutical Factories, Oil Refineries, etc.

We list a few of the users:

The National Biscuit Co.
Pratt & Lambert Varnish Co.
American Bank Note Co.
War Dept., U. S. Government.
American Druggists' Syndicate.
Packard Motor Car Co.
N. Y. Edison Co.
Consolidated Gas Co.
Goodrich Tire Co.
American Car & Foundry Co.
Goodyear Tire & Rubber Co.
Penn R. R.
Eastman Kodak Co.
Winchester Repeating Arms Co.
American Tobacco Co.

CATALOGS AND DRAWINGS:

Our catalog illustrates many types and we have hundreds of drawings showing special outfits for special conditions and requirements. New drawings will be made to meet new conditions.

SERVICE DEPARTMENT:

If you will consult us as to your problems no matter how difficult, our Service Department will give them careful study and make recommendations. Only in case a Sedgwick outfit will give you better results than anything else will a Sedgwick outfit be recommended.

DELIVERIES:

Catalog sizes are carried in stock for immediate shipment.

Special outfits can be shipped a few days after receipt of order.

SEE OUR ADVT. IN MECHANICAL ENGINEERING THE JOURNAL OF THE A.S.M.E.

Digitized by Google

G. L. STUEBNER IRON WORKS

HANCOCK ST., AND VERNON AVE.

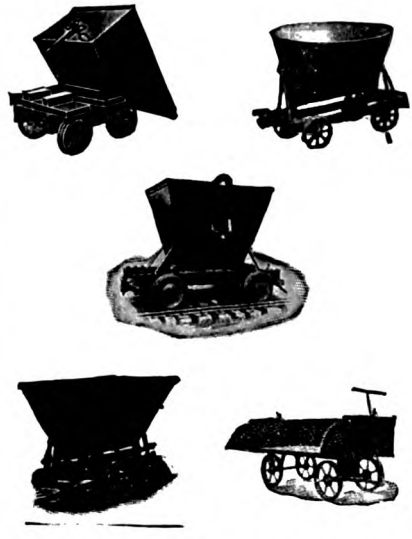
LONG ISLAND CITY, NEW YORK, N. Y.

Manufacturers of Hoisting Buckets, Narrow Gauge Cars, Hand-dump Carts Asphalt-Melting Kettles, Small Steel Tanks, Etc.

Turn-over and Bottom Dumping Buckets of All Types and Sizes; Steel Skips.



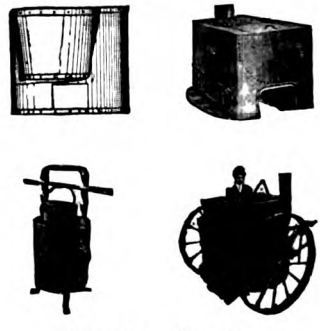
Flat, End and Bottom Discharge Industrial Cars



Push Carts for Handling Coal, Ores, Earth, Concrete, Etc.



Asphalt Heaters and Lead Melting Furnaces, Etc.



Catalogue No. 550

Digitized by Google

JOHN A. ROEBLING'S SONS COMPANY

TRENTON, N. J.

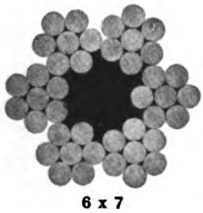
Manufacturers of Wire Rope of All Kinds

We manufacture and keep in stock at our works in Trenton and at warehouses, agencies and branches in large cities wire rope, made from Iron, Cast Steel, Extra Strong Cast Steel, Plough Steel and Blue Center Steel.

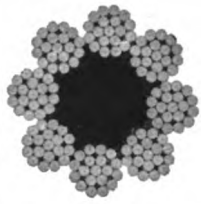
We give below tables of strengths, etc., for the standard construction of BLUE CENTER STEEL ROPE. This rope is also furnished with 6 strands of 37 wires each and with 8 strands of 19 wires each.



6 x 19



6 x 7



8 x 19



6 x 37

Roebling Blue Center Steel Rope is recommended as the best to use where extreme conditions tend to bring extraordinarily severe stresses, and is particularly well adapted to resist abrasion.

The hemp center of this rope, where a hemp center is used, is colored blue to distinguish it from other grades.

SEE OUR ADVTS. IN MECHANICAL ENGINEERING THE JOURNAL OF THE A.S.M.E.

BLUE CENTER STEEL HOISTING ROPE
Composed of 6 Strands and a Hemp Center, 19 Wires to the Strand

Trade Number	Diameter in inches	Approx. circumf. in inches	Approx. weight per foot	Approx. strength in tons of 2000 lbs.	Proper working load in tons of 2000 lbs.	Diam. of drum or sheave in feet advised
00	2¾	8⅝	11.95	315	63	11
0	2½	7⅞	9.85	262	53	10
1	2¼	7⅛	8	210	42	9
2	2	6¼	6.30	166	33	8
2½	1⅞	5¾	5.55	150	30	8
3	1¾	5½	4.85	133	27	7
4	1⅝	5	4.15	110	22	6½
5	1½	4¾	3.55	98	20	6
5½	1⅜	4¼	3	84	17	5½
6	1¼	4	2.45	69	14	5
7	1⅛	3½	2	56	11	4½
8	1	3	1.58	45	9	4
9	⅞	2¾	1.20	35	7	3½
10	¾	2¼	.89	26.3	5.3	3
10¼	⅝	2	.62	19	3.8	2½
10½	15/16	1¾	.50	14.5	2.9	2¼
10¾	½	1½	.39	12.1	2.4	2
10a	7/16	1¼	.30	9.4	1.9	1¾
10b	⅜	1⅛	.22	6.75	1.35	1½
10c	5/16	1	.15	4.50	.9	1¼
10d	¼	¾	.10	3.15	.63	1

BLUE CENTER STEEL ROPE
For Haulages and Transmissions. 6 Strands and a Hemp Center, 7 Wires to the Strand

11	1½	4¾	3.55	90	18	11
12	1⅜	4¼	3	79	16	10
13	1¼	4	2.45	67	13	9
14	1⅛	3½	2	52	10	8
15	1	3	1.58	42	8.4	7
16	⅞	2¾	1.20	33	6.6	6
17	¾	2¼	.89	25	5	5
18	11/16	2⅛	.75	20	4	4¾
19	⅝	2	.62	17½	3.5	4½
20	9/16	1¾	.50	13	3.5	4
21	½	1½	.39	11	2.2	3½
22	7/16	1¼	.30	7¾	1.5	3
23	⅜	1⅛	.22	6½	1.3	2½

A copy of our catalogue, giving information about other wire ropes and wire rope fittings, will be mailed on application.

Digitized by Google

NEWHALL CHAIN FORGE & IRON CO.

90 WEST ST., NEW YORK

156 Second St.
SAN FRANCISCO

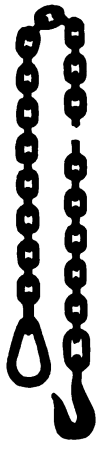
17 North 6th Street
PHILADELPHIA

Manufacturers of Welded Chains of Every Description

CRANE AND DERRICK SLING CHAINS:

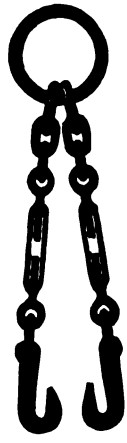
410

Single Sling



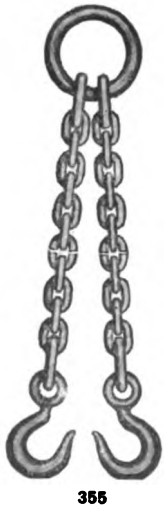
351

Buckle Sling



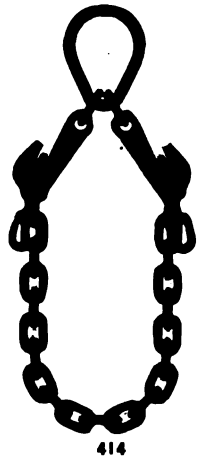
415

Double Sling



355

Adjustable Sling



414

Four-Leg Sling



411

Hoist Hook



365

Grab Hook



366

Non Skid Cross Chain Hook



425

BLOCK CHAINS
BRAKE CHAINS
DREDGE CHAINS
ANCHOR CHAINS
SHACKLES **FORGINGS**
STEAM SHOVEL CHAINS

Digitized by Google

Metals, Alloys and Other Materials

EQUIPMENT CATALOGUED IN THIS DIVISION

Data begins on page number given, as closely as can be divided. Consult Directory Section (green pages) for specific products.

	PAGE
Alloys	413
Babbitt Metal	416
Brass and Brass Shapes	414
Bronzes	415
Castings, Die	424
Copper and Copper Shapes	414
Fibre, Vulcanized	417
Forgings	428
Metals, Bearing	413
Metals, Non-Ferrous	413
Solders	416
Stampings, Metal	434
Steels, Alloy	421
Steels, Cold Drawn	421
Wire, Copper	414

See next page for list of firms catalogued

CATALOGUE SECTION

PART V **Pages 411-434**

Digitized by Google

INDEX TO FIRMS CATALOGUED IN PART V

A

Acme Die-Casting Corp'n 424
Allan, A. & Son 413
American Brass Co. 414
American Forge & Machine Co 430, 431
American Manganese Bronze Co. 415
American Vulcanized Fibre Co. 417
Andrews Steel Co. 421
Atlas Crucible Steel Co. 422

B

Barnhart Brothers & Spindler 425

C

Continental Fibre Co. 418

D

Delaware Hard Fibre Co. 419
Diamond State Fibre Co. 420
Doehler Die-Casting Co. 426

G

Geuder, Paeschke & Frey Co. 434

L

Lakeside Forge Co. 429
Lumen Bearing Co. 416

M

Milwaukee Die Casting Co. 427
Mueller Metals Co. 428

T

Transue & Williams Steel Forging Corp'n. 432

U

Union Drawn Steel Co. 423

V

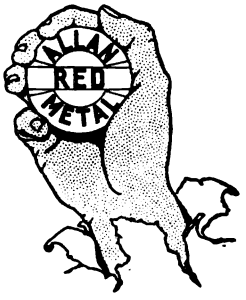
Vulcan Steam Forging Co. 433

Digitized by Google

A. ALLAN & SON

HARRISON, NEW JERSEY

Inventors and Sole Manufacturers of Allan Red Metal and Allan Bearing Bronze



TRADE MARK

ALLAN RED METAL:

The Genuine 50% Copper and 50% Lead Alloy.

This alloy is not, strictly speaking, a Babbitt metal, nor can it be classed as a bronze, it just fits in the intermediate field to do such work where white Babbitt metals would not give satisfaction, as they readily change their form with an increase of temperature and yet conditions in many cases are such that it is impossible to use a bronze. Allan Red Metal combines the best qualities of the Babbitt and bronze alloys. It has the high anti-friction qualities of the Babbitt class with the temperature-resisting qualities of the bronze class.

Where will you find a bronze or Babbitt alloy that will stand up to the following service?

As shaft packing on steam turbines as a substitute for carbon.

As piston rod packing for locomotive service where temperatures run up to 650° Fahr.

As a bearing face for steam pistons with 150 pounds pressure and 200° superheat.

Allan Red Metal for many years has been meeting these service conditions and also overcoming troublesome conditions in crank pin, cross-head and motor bearings where white Babbitt metals have proven inefficient for the service conditions.

For over a quarter of a century we have been manufacturing bearing alloys, Allan Red Metal and Allan Bearing Bronze, our lead-copper and lead-copper-tin bearing alloys. They are made by The Allan Process, invented by Andrew Allan, Sr., in 1876. This is the only process which makes possible the alloying of lead-copper and lead-copper-tin in any desired proportion and assures the production of castings of uniform physical structure.

Digitized by Google

AMERICAN BRASS COMPANY

WATERBURY, CONNECTICUT, U. S. A.

MILLS AND FACTORIES

ANSONIA BRANCH
Ansonia, Conn.

BUFFALO BRANCH
Buffalo, N. Y.

KENOSHA BRANCH
Kenosha, Wis.

TORRINGTON BRANCH
Torrington, Conn.

WATERBURY BRANCH
Waterbury, Conn.

Manufacturers of Wrought Brass and Copper Materials for Engineering Purposes

PRODUCTS:

Brass, Copper, and Nickel Silver: in all forms of Sheet, Wire, Rods, and Tubes.

Condenser Tubes: Admiralty and other Special Grades for Marine and Stationary Installations.

Brass and Copper Pipe: Iron Pipe and Plumber's sizes, especially desirable for Concealed Work, and Hot Water Carriers.

Phosphor Bronze Tubes: For Bushings and Bearings.

Tobin Bronze Tubes, Rods, Sheets: Highly resistant to Corrosion and of High Tensile Strength. Have given most favorable results when used for Marine or Hydraulic Construction.

Copper Tubes: In long lengths for bending into Coils.

Boiler and Heater Tubes:

Evaporator Tubes:

Locomotive Tubes: Ferrule Tubes, Heater and Pump Tubes.

Die Pressed Metals: Made from Extruded Rods. A wide range of shapes are possible by this process, and are sufficiently accurate in dimensions to eliminate many of the machining operations heretofore necessary when rough castings were used.

Extruded Sections: Made from Wrought Brass and high tensile strength Bronze Alloys in the form of irregular shaped Bars, heavy Angles, Channels, and Mouldings, adaptable to many Engineering Purposes.

Turbine Blading and Caulking Material: Brass, Cupro Nickel, and Monel Metal.

Bare and Insulated Copper Wire and High Tensile Strength Transmission Cable:

Commutator and Bus Bar Copper: For all kinds of Electrical Construction.

SERVICE:

The Mills of The American Brass Company, geographically located to insure prompt service to all sections, are equipped with extensive facilities for Manufacturing a complete line of Non-Ferrous Materials, which will meet the fullest requirements as to Quality, Finish, Accuracy, and Dependability.

Special Metallurgical Problems regarding the use and adaptability of Brass and Copper Products, receive the attention of an efficient Technical Department, the service of which is available to all those interested.

Catalogs, including Price Lists, and Tables of Sizes and Weights, will be sent upon request.

Digitized by Google

AMERICAN MANGANESE BRONZE COMPANY

GENERAL OFFICES AND WORKS

HOLMESBURG, PHILADELPHIA, PA.

"High Grade Bronzes for Engineering Purposes"

INTRODUCTORY:

We are prepared to quote prices and deliveries on any commercial Bronzes in the following forms: CASTINGS—INGOTS—FORGINGS—RODS—SHEETS

SPARE'S MANGANESE BRONZE:

shows a uniform even grain and is tough and ductile. It has the equivalent tensile strength of medium carbon steel. It is non-corrosive even in sea water and acid mine waters. Intricate castings can be poured from this metal.

HY-TEN-SL BRONZE:

is the strongest of all bronzes; being about equal to nickel steel. It is a homogeneous alloy of close, even texture and can readily be cast into difficult shapes. It can be forged rolled and extruded. It is non-corrosive.

HY-TEN-SL GEAR BRONZE:

is very close grained and exceptionally strong and tough. It has good anti-frictional and free machining qualities. It is an excellent metal for use in Worm Gear Drives for Auto Trucks, etc.

NAVAL BRONZE:

is a tough ductile alloy very much softer than Manganese Bronze and showing a lower tensile strength and yield point and has a coarser grain.

EQUIPMENT AND FACILITIES:

Our large melting capacity and up-to-date handling equipment enables us to take care of the largest castings desired.

TESTING FACILITIES:

We have an up-to-date testing laboratory under the constant supervision of a chemist.

Physical tests are conducted on finished material on every heat; thereby insuring the customer of a uniform product to meet their requirements.

CATALOG AND LITERATURE:

We issue a complete catalog, as well as special bulletins on MARINE PROPELLERS, INGOTS, HY-TEN-SL BRONZE and GEAR METAL.

Any of the above may be had for the writing.

Digitized by Google

LUMEN BEARING COMPANY

GENERAL OFFICE: 197 LATHROP STREET
BUFFALO, NEW YORK
WORKS: YOUNGSTOWN, O., AND BUFFALO, NEW YORK

Manufacturers of Brass and Bronze Castings, Babbitts, Solders, MACHINEBRONZE and Mill Brasses

PRODUCTS:

MACHINEBRONZE—Cored and Solid Bronze Bars, Miscellaneous Brass and Bronze Castings, Babbitt Metals, Mill Brasses, etc.

MACHINEBRONZE is made to a formula established by us as a standard for automobile, machinery construction, and repair bronze. It is carried in stock in two hundred and fifty-four sizes in twelve-inch cored and solid bronze bars. It is universally recommended as the best general purpose bronze for all work of the aforesaid character. List of sizes and distributors furnished upon request.

BRASS AND BRONZE CASTINGS:

We have the most modern metallurgical, chemical and physical laboratories that cannot be equalled in any plant of this kind in the country. Some of the castings we are prepared to make are as follows: Bridge bearings, thrust rings, discs, foot blocks, pump bodies, gear wheels, pulp and paper mill knives, air valves, relief valves and casings, crosshead and crank pin brasses, vibratory work under high speed and pressure, blow off valves, sleeves, covers, and all parts subjected to hot sulphurous acids, mine pump parts, locomotive crosshead and crank pin bearings, water pump bushings, plunger guides, electrical work, propeller hubs, blades, gas engine bases and cases, valve stems, lathe and machine tool bearings, gears of all kinds, general red-brass work, etc. This partial list will give some idea of the diversified work we are equipped to handle. All castings made to your specifications or to our standard tested formulae.

BABBITTS:

Our genuine babbitt is sold under the brand name of Stannum. It is hard and tough, capable of great service and is theoretically a perfect alloy. It is used in lining bronze shells in gas engines, connecting rod bearings, etc., and can be offered in competition with any of the strictly genuine babbitts.

It is also especially recommended for all automobile, tractor, Diesel engine bearings and all bearings subjected to high speed and very heavy duty.

One of our other high speed babbitts is known as Lotus Brand. Being a lead base metal containing a high percentage of tin and antimony, it melts at a low temperature, has small contraction and adheres well to other metals. It can be easily peened. It is used to excellent advantage for transmission machinery, light machine tools, motors, generators, and where speed is an important factor under medium pressure. Write for detailed information on these and other brands of babbitts and solders and their uses.

MILL BRASSES:

Quotation on any requirements for special and standard mill bronzes at Youngstown plant. Our installations number among the largest steel mills in the country. Write for personal investigation of your needs.

Digitized by Google

AMERICAN VULCANIZED FIBRE CO.

Established 1873

WILMINGTON, DELAWARE

Manufacturers of Vulcanized Fibre

***VUL-COT* FIBRE:**

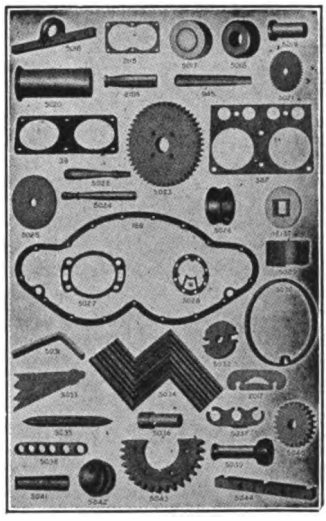
(*A higher development of vulcanized cotton fibre.*)

***"VUL-COT* Fibre"** is the trade name of an extra fine quality of vulcanized cotton fibre, manufactured by the first producers of this material in America—the holders of the original patents, and for many years the sole American manufacturers. An experience, covering nearly half a century, has enabled them to produce a quality of fibre that is pure in content and flawless in structure. Only pure raw material is used.

The manufacturing processes are carried out under skilled supervision. Each stage is accurately and scientifically controlled. All traces of chemicals are removed. A rigid system of analysis, testing and inspection ensures this.

If you would be certain that the fibre used in your plant or product is the best quality obtainable, be sure that ***VUL-COT*** Fibre is specified. It is sold in sheets, rods and tubes of all standard sizes, or finished parts machined to your specifications.

Just a few of the thousands of parts which can easily be made of ***VUL-COT*** Fibre.



PHYSICAL PROPERTIES OF *VUL-COT* FIBRE

Tensile Strength.....	9,000–14,000 lbs. per sq. in.
Compressive Strength.....	32,000–37,000 lbs. per sq. in.
Resistance to Shearing.....	9,000–13,000 lbs. per sq. in.
Electrical Rupture.....	150–400 volts per .001 thickness
Specific Gravity.....	1.2–1.7

We maintain an Engineering Department to help you get the greatest good from the use of ***VUL-COT*** Fibre. Put your problem up to them. Samples, prices and the interesting booklet "The Material with a Million Uses" will be sent you promptly upon request.

Digitized by Google

THE CONTINENTAL FIBRE CO.

NEWARK, DELAWARE

NEW YORK OFFICE
233 Broadway

PITTSBURGH OFFICE
301 Fifth Ave.

CHICAGO OFFICE
332 S. Michigan Ave.

SAN FRANCISCO OFFICE
525 Market Street

LOS ANGELES OFFICE
411 South Main Street

The principal products of this Company are Vulcanized Fibre, Conite, Bakelite-Dilecto and Continental-Bakelite. Although manufactured primarily as Insulating Materials, their exceptional physical qualities render them adaptable to a wide range of Mechanical Applications.

BAKELITE-DILECTO:

Bakelite-Dilecto is an insulating material made of paper laminations impregnated with liquid Bakelite pressed together and hardened. It is manufactured in the form of sheets, tubes and rods. There are two sizes of standard sheets, 30″ x 40″ and 37″ x 37″, which may be obtained in any thickness from 0.005″ to 3″. Tubes are made 36″ long with inside diameters of not less than $\frac{3}{16}$″ and outside diameters of not more than 6″ with any wall thickness $\frac{1}{64}$″ and over. Rods are made from $\frac{1}{8}$″ to 3½″ diameter.

While Bakelite-Dilecto is a laminated material the laminations are so thoroughly saturated with Bakelite that the resultant product is practically homogeneous. Its many remarkable qualities adapt it to a wide range of purely mechanical uses.

Bakelite-Dilecto may be easily sawed, filed, machined and drilled in any direction without splitting or cracking. It saws like bone and turns like a soft metal such as copper. It can be punched successfully up to $\frac{1}{8}$″ in thickness with a plain die. Drilling makes a clean, smooth hole which taps easily, leaving clean, sharp threads.

The resistance to heat of Bakelite-Dilecto is remarkable. It will withstand a dry heat of 200° F. continuously and 300° F. for short periods without softening, blistering, cracking or change of shape.

When tested for mechanical strength Bakelite-Dilecto behaves in a manner similar to cast iron. It has an average tensile strength of 10,000 lbs. per square inch, and under compression will test 20,000 lbs. per square inch parallel to the laminations and 40,000 lbs. per square inch perpendicular to the laminations.

Special Shapes: Finished articles from Bakelite-Dilecto sheet or tube, completely machined to exact gauge, ready for assembling, will be furnished in accordance with design. Quotations on finished or semi-finished articles together with samples of work done will be gladly submitted upon receipt of specifications. Inquiries for this class of work are solicited.

CONTINENTAL-BAKELITE:

Continental-Bakelite is a laminated material made of cotton duck impregnated with liquid Bakelite pressed and hardened. It is made by the same process as Bakelite-Dilecto and may be obtained in the same sizes of sheets, rods, tubes and special shapes. It has the same physical and chemical properties but is somewhat weaker mechanically.

BAKELITE-DILECTO GRADE G:

Gear Stock: The most important property of Bakelite-Dilecto Grade G is its extreme toughness which makes it an ideal material for noiseless gears. When meshed with a steel gear it takes up the shock because of its low modulus of elasticity, making a smooth and quiet running gear. Being water-proof, it will not soften or lose its mechanical strength under any weather conditions. The oil absorption is practically zero.

A gear made of Bakelite-Dilecto Grade G will, under ordinary conditions, take the place of a cast iron gear of the same size and have about the same life. The teeth of such a gear need no shroud, are stronger than, and will outwear the teeth of any other non-metallic gear.

We are also makers of high grade **Vulcanized Fibre** and **Conite,** the best thin fibrous insulating material.

SEE OUR ADVTS IN MECHANICAL ENGINEERING THE JOURNAL OF THE A.S.M.E.

Digitized by Google

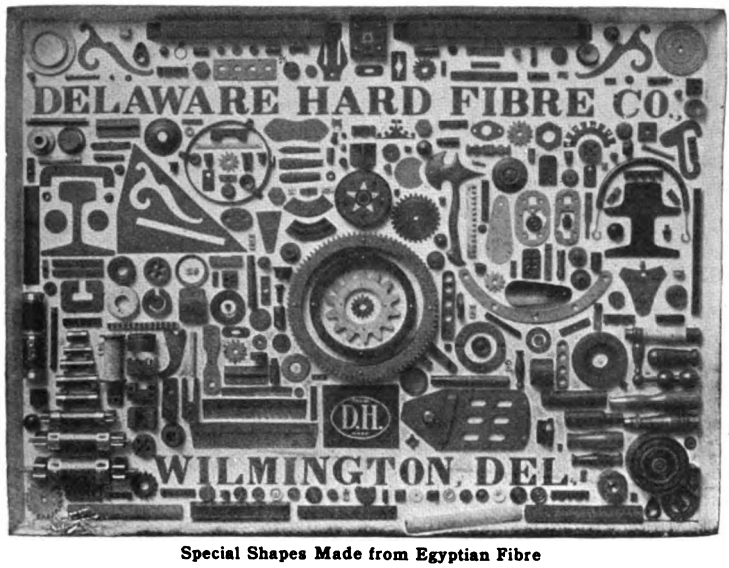
DELAWARE HARD FIBRE CO.

WILMINGTON, DEL.

NEW YORK OFFICE
50 CHURCH ST.

CHICAGO OFFICE
564-70 W. MONROE ST.

Manufacturers of Vulcanized Fibre



Special Shapes Made from Egyptian Fibre

D.H. Egyptian TRADE MARK

D. H. EGYPTIAN FIBRE:

Egyptian Fibre is a particular grade of fibre made under controlled conditions, and is the result of several years' experimenting to produce a dense fibre of a uniform hardness.

Vulcanized fibre to-day is a recognized factor. D. H. Egyptian Fibre especially, because of being dense and uniform, can be worked with less waste and increased production. It excells all ordinary fibre, due to the fact that it is the hardest and closest grained fibre made. It is also free from carbon and has the greatest wearing properties, is the most homogeneous and the best insulating.

D. H. Egyptian Fibre is the only fibre approved by the underwriters as an insulating material, and a large part of the big users of fibre specify it for insulating and mechanical purposes.

It contains no coloring matter or grit and works beautifully with machine tools. The color of the product has been left to nature, for from experience it was found that excessive bleaching or the addition of pigments or dyes were at the expense of the quality.

D. H. Egyptian Fibre can be turned, drilled, machined, threaded and formed in dies better and faster than any other fibre. The Specific Gravity of D. H. Egyptian Fibre is from 15% to 20% greater than that of common fibre. On account of its extreme dielectric and tensile strength, D. H. Egyptian Fibre to-day enjoys the distinction of being the leading product of its kind.

Produced in Sheets, Rods, Tubes and Special Shapes.

Comparative tests showing superior qualities of Egyptian stock. For this test we selected 2 pieces of stock 1/8 inch thick.

	Egyptian Fibre	Common Vulcanized Fibre
Specific Gravity	1,480	1,100
Absorption Water, 24 hrs.	25%	70%
Hardness Scleroscope	50	25
Shearing Strength, sq. in.	13,000	9,000
Crushing Strength, sq. in.	43,000	33,000
Tensile Strength, sq. in.	13,000	8,000
Breakdown Voltage	50,000	12,500

Samples, prices and booklet on request.

Digitized by Google

DIAMOND STATE FIBRE COMPANY

BRIDGEPORT near PHILADELPHIA, PENNA.

BRANCH FACTORY AND WAREHOUSE: CHICAGO
OFFICES IN PRINCIPAL CITIES.
IN CANADA, DIAMOND STATE FIBRE CO. OF CANADA, LTD., TORONTO

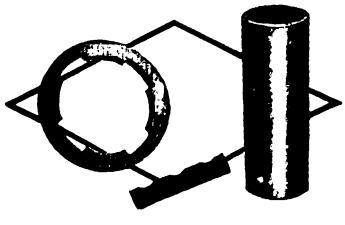
Producers of Diamond Fibre in sheets, rods and tubes for general manufacturing purposes. Makers of Trunk Fibre; Railroad and Signal Insulation; Disfico Insulation; Diamond Fibre Receptacles — trucks, roving cans, waste baskets and fibre containers of all kinds; Diamond F Protective Papers for wrapping; Condensite Celoron or waterproof fibre.

Diamond Fibre:

Our basic product is a tough, homogeneous material almost as hard as iron yet lighter than aluminum. It will take any machining process or may be bent and formed. It combines great tensile, compressive, shearing and dielectric strength. It is made in standard colors, red, gray or black, and supplied in standard sheets, rods and tubes of various standard thickness and size.

Technical Data: Tensile strength longitudinal 12200 pounds and transverse 8100 pounds to the square inch. Compressive strength perpendicular to laminations 25120 pounds. Parallel to laminations 9240 pounds per square inch. Shearing strength 1/8 inch fibre 10920 pounds per square inch. Dielectric strength approximately 200 volts per mil. Specific gravity 1.38.

Uses: Especially adapted for manufacture of electrical and mechanical equipment, machined parts, bushings, gaskets, washer automotive parts, conduits, handles, pulleys, etc., etc.



Condensite Celoron:

Is a special grade of waterproof fibre designed for use where extreme resistance to water and high dielectric properties are essential. The material is absolutely non-hygroscopic and will not absorb moisture from the atmosphere regardless of the humidity.

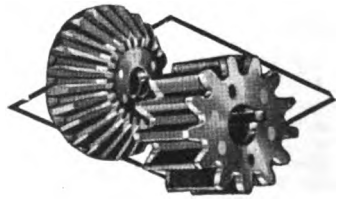
Uses: Condensite-Celoron is especially recommended for radio and wireless work both as a superior insulating material and for making panels, bases, cleats, conduits, handles and other parts of high grade electrical equipment. It is made in two colors, natural (brown) and black. Supplied in sheets, rods and tubes of standard dimensions.

Condensite Celoron for Silent Gears:

This particular grade is made especially for cutting silent gears. It is extremely water-resistant, high in dielectric strength, impervious to oils and most acids, highly resilient and self-supporting. Gears made of it, in standard size, require no shrouds or end plates. It is as strong as cast iron and when properly applied and lubricated will often outlast cast iron or brass gears. It can be used for duties in places and under conditions where the average non-metallic gear would be impossible.

Condensite Celoron for gears is supplied in standard size sheets 36x36 and 36x40 in any width up to and including 3 inches. Write for samples and booklets.

For the convenience of our Western customers we maintain complete stocks and machining facilities at our Western branch factory and warehouse, Chicago.



Digitized by Google

THE ANDREWS STEEL COMPANY

NEWPORT, KY.

GENERAL SALES OFFICE: NEWPORT, KY.
DISTRICT SALES OFFICE: 1040 McCORMICK BLDG., CHICAGO, ILL.

Manufacturers of Special High Grade Basic Open Hearth Forging Billets, Nickel, Chrome Nickel, Vanadium, Chrome Vanadium, and Chrome Special Steel, Slabs, Sheet and Tin Bars a Specialty

SPECIAL HIGH GRADE FORGING BILLETS:

A liberal croppage is your assurance of a steel that is absolutely sound, which is a prime requisite of all billets to be used in the making of forgings that are dependable.

By years of constant application of liberal discard at the bloom shear, we have become recognized as a most reliable source of supply for forging billets of absolutely sound steel.

SPECIAL ALLOY STEELS:

The making of alloy and special steels has always been a part of our regular production and the untiring efforts and coöperation of our technical and practical men the art of producing durable homogeneous alloys to the most rigid specifications. Some of these steels that have never been surpassed or equalled are as follows:

Nickel, Chrome, Chrome-Nickel, Chrome-Vanadium, Vanadium, etc.

USES:

The almost innumerable uses to which Special High Grade forging steels have been successfully applied is appropriately prescribed by us for all purposes where consistent high quality is necessary. A few of the major uses are as follows: For steam and electric railway heavy forgings, drop forgings for automobiles, tractors, trucks, gas engines, etc., die blocks, machine tools and other diversified applications.

HIGH QUALITY PRODUCTS:

We make sheet and tin bars, slabs and rerolling billets and guarantee entire satisfaction in every respect.

Full information covering our warehouse stock will be regularly furnished, without obligation.

Alloy steel specialists employed by this company are constantly solving all kinds of steel problems, and their services are at the disposal of those who would desire a satisfactory solution of their needs.

Digitized by Google

ATLAS CRUCIBLE STEEL COMPANY

GENERAL SALES OFFICES: HANNA BLDG., CLEVELAND, OHIO

WORKS: DUNKIRK, N. Y.

BRANCH SALES OFFICES

NEW YORK	DETROIT	BOSTON
PHILADELPHIA	CLEVELAND	MILWAUKEE
CHICAGO	BUFFALO	ATLANTA
ST. LOUIS	PITTSBURGH	CINCINNATI

BRANCH WAREHOUSES

BOSTON CHICAGO CLEVELAND DETROIT ST. LOUIS

TRADE L-XX MARK
REG. U.S. PAT. OFF.
High Speed

PRODUCTS:

L-XX High Speed Steel.
Atlas Hot Die Steel.
Atlas Special Alloy.
Atlas Triple Extra Tool Steel.
Atlas Double Extra Tool Steel.
Atlas Extra Tool Steel.
Atlas Refined Tool Steel.
Deward Oil Hardening Steel.
E. B. Alloy.
ACSCO Special Steels.

Licensed Manufacturers of Stainless Steel for Cutlery.

Ball Steel.
Magnet Steel.
High Speed Drill Rod.
Carbon Drill Rod.
Die Blocks and Discs.

Drop Forged High Speed Steel Forgings for Keyway Cutters, Milling Cutters and Special Tools.

L-XX HIGH SPEED STEEL:

To make one grade of high speed steel for general all-round work, and make that grade the best, has been the aim of this community of steel makers, and L-XX High Speed is the masterful accomplishment.

This grade is especially recommended for turning, boring, planing, slotting and shaping tools. Twist drills and all forms of milling cutters, gear cutters, taps, reamers, special dies, and every purpose where any high speed steel can be used.

ATLAS HOT DIE STEEL:
For Hot Work

This is a "Red Hard" steel, resisting checking and holds its edge at temperatures, distinctive to simple carbon tool steel.

Useful for hot shear blades, hot punches, header and gripper dies; used in bolt and rivet making and all other hot work.

DEWARD OIL-HARDENING NON-SHRINKING TOOL STEEL:

A few of its uses are threading dies, chasers, taps, reamers, and all master tools. For gauges, plugs, etc. For stamping, punching and trimming dies.

ALLOY STEELS:

We are prepared to furnish all the standard grades of alloy steels such as those specified by the S.A.E.; also special types of chrome-molybdenum and chrome-molybdenum-vanadium steels. These latter steels have been developed to meet the most exacting requirements of motor car manufacture and special machine parts. These steels will show the maximum combination of strength and toughness and are especially adaptable for such parts as gears, axles, crank shafts, connecting-rods and springs.

ATLAS SPECIAL PURPOSE STEELS:

We manufacture and offer from warehouse stock specific grades of steel for special purposes; steels for machine tool and automotive parts, small arms parts, rifle barrels, spindles, mandrels, chuck-jaws, collets.

SERVICE:

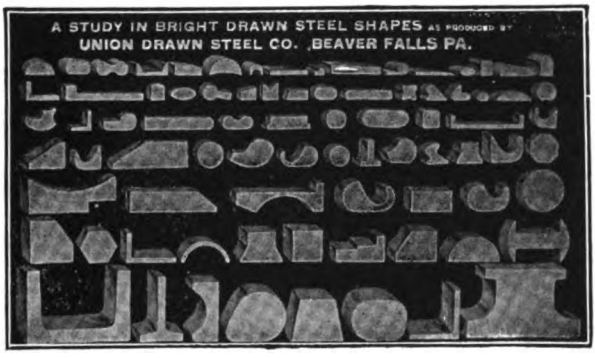
We will be pleased to co-operate with you in the selection of the proper steel for your requirements.

Digitized by Google

UNION DRAWN STEEL COMPANY

GENERAL OFFICES: BEAVER FALLS, PA.

WORKS: BEAVER FALLS, PA., and GARY, IND.



COLD DRAWN OR TURNED AND POLISHED:

SHAFTING

SCREW STEEL { Bessemer / Open Hearth

ALLOY STEELS { Nickel—1½% & 3½% / Nickle Chromium / Chromium / Chromium—Vanadium, Etc.

AXLES, PISTON RODS

SPECIAL SHAPES

SPECIAL CASE-HARDENING STEELS

Cold Finished Bessemer, Open Hearth, Crucible and Electric Furnace Steels

Shafting: We use only the best quality of Soft Steel and are manufacturing under recent patents, covering machinery and appliances, by a process superior to anything known for producing great accuracy, a highly polished surface and the necessary straightness.

Piston and Pump Rods: Of special steels up to 70 or 60 feet long.

Screw Steels: For Automatic machine uses at high speeds.

Elevator Guides: Cold Drawn, Straight, with matched joints.

Special Shapes of Cold Drawn Steel made to meet your specifications; often more economical than castings and forgings where finished parts are needed.

Complete Warehouse Stocks Carried at

NEW YORK
DETROIT
CINCINNATI
PHILADELPHIA
CHICAGO

Branch Sales Offices at BOSTON, BUFFALO and CLEVELAND, OHIO.

SEE OUR ADVTS IN MECHANICAL ENGINEERING THE JOURNAL OF THE A.S.M.E.

Digitized by Google

ACME DIE-CASTING CORPORATION

MAIN OFFICE AND PLANT

BUSH TERMINAL, No. 5, BROOKLYN, N. Y.

Aluminum-Zinc-Tin and Lead Alloys

BRANCH OFFICES

BOSTON, MASS.: 176 Federal St. DETROIT, MICH.: 744 David Whitney Bldg.
ROCHESTER, N. Y.: 242 Powers Building

ACME-DIE
•CASTINGS•
ALUMINUM·ZINC·TIN & LEAD ALLOYS

Those who have been closely in touch with the trend of finished cast parts in recent years have observed a marked development and higher accomplishment in the art of die-castings. A natural consequence of this evolution is the growing demand for castings of a higher standard than ever obtained in the past.

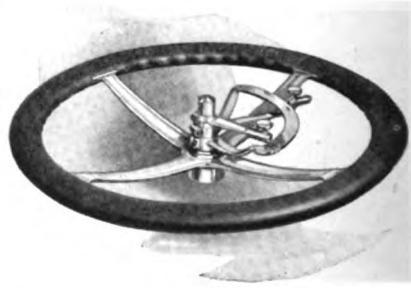
In making the **Acme Die-Castings,** we have held present-day requirements constantly in view and have created methods by which they are best fulfilled. Acme Die-Castings, therefore, are a distinctive modern product. As they are made with the most advanced ideas of construction in the art, they embody principles that experience has demonstrated to be the foundation of superior quality and the basis of quantity production.

Produced under these conditions, they are a product that not only meets the demands of the exacting technical expert, but insures a means which facilitates mechanical assembly.

Acme Die-Castings are made accurately in aluminum, zinc, tin and lead alloys, smoothly finished, and free from defects. As they are delivered ready to assemble, the ever-increasing expense of labor and overhead entering into the cost of finishing parts is eliminated.

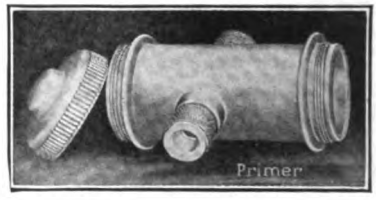
Submit us a sample of blue print of your parts, and we shall be pleased to submit you an estimate.

AUTOMOBILE PARTS:



The above illustration shows a Steering Wheel Spider, a Sector, a Throttle Lever, and a Spark Lever completely assembled. These castings are a few of the many automobile parts produced by the Acme process.

ELECTRICAL PARTS:



Parts for electrical devices which have been considered impossible to die-cast have been made successfully by the Acme process. Special parts requiring very thin walls, accurate depressions, projections, inserts and threads are die-cast absolutely true to shape and detail, ready to assemble, polish or plate as they come from our plant.

ENGINEERING DEPARTMENT OF THE ACME DIE-CASTING CORPORATION:

Our Engineering Department is in charge of one of the most highly skilled die-casting engineers in the industry, who always will be at your service for designing and consultation.

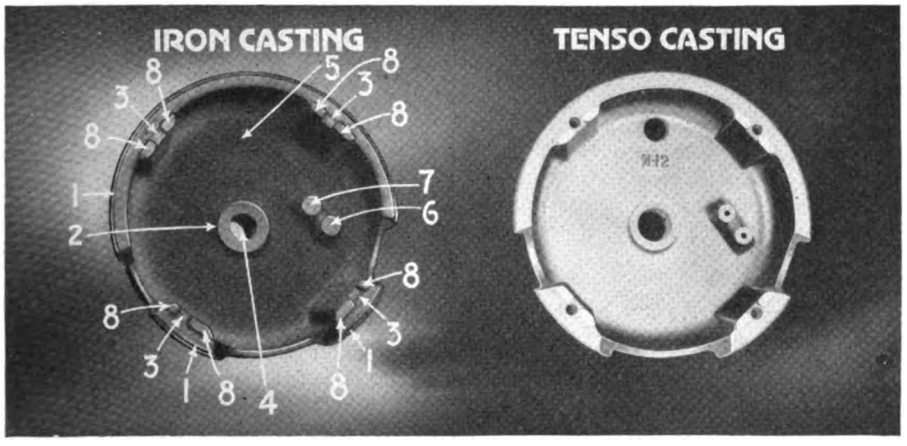
Submit your problems and we will be more than pleased to co-operate with you.

Digitized by Google

BARNHART BROTHERS & SPINDLER

MONROE AND THROOP STREETS,
CHICAGO, ILLINOIS

Die Castings of TENSO Alloy, noted for great tensile strength, hardness and lightness, Superior Die Castings of Standard White Metal and Special White Metal Alloys



As an example of the saving effected by the use of TENSO Die Castings compared with rough-cast machine-finished parts of cast iron, malleable or brass, we picture above the end shield of a small electric motor. The iron casting was produced in the ordinary way, delivered to the manufacturer in the rough, requiring the following machine operations before ready for use—

1. Turning Face of Flange all round.
2. Spot Facing Boss around Bearing.
3. Drilling 4 Holes for Assembling Bolt.
4. Boring and Reaming Hole for Bushing.
5. Drilling Hole for Feed Wires.
6 and 7. Drilling Holes for Brushes.
8. Machining 8 Bosses to Fit Body Housing.

The same part die cast of TENSO Alloy is CAST FINISHED and exact, delivered ready for assembling. Tensile strength of the iron casting is only 20,000 pounds per square inch—the same part in TENSO 45,000 pounds. The iron casting weighs 2 pounds 8 ounces—the TENSO part only 1 pound 13 ounces.

This is but typical of what can be done. The more intricate the part the greater the saving, as a rule. Our Die Casting process is effective and economical for nearly all parts of intricate or exacting character up to 8 inches diameter or length—and in some cases larger parts can be successfully produced.

In Tenso We Have that Needed Medium—Filling the Gap between Ordinary Die Castings and Cast Iron Parts Low in Tensile Strength—and the More Costly Bronze, Brass, Malleable and Steel Parts of High Tensile Strength.

SEE OUR ADVT. IN MECHANICAL ENGINEERING

TENSILE STRENGTH OF VARIOUS METALS COMPARED

	Pounds per Sq. In.
TENSO Superior Die Castings	45,000
Standard White Metal Zinc Alloy	16,100
Brass Castings	22,000 to 28,000
Aluminum Castings	14,000 to 27,500
Gray Iron	20,000 to 23,000
Malleable Iron	30,000 to 45,000
Manganese Bronze Castings	65,000 to 65,000
Soft Steel, 15 Carbon	55,000 to 80,000
Hardened Steel, 40 Carbon	75,000 to 85,000

LIGHTNESS AND HARDNESS OF VARIOUS METALS COMPARED

	Wt. per Cu. In.	Brinell Hardness Number
† TENSO Superior Die Castings	0.210 lb.	79.6
Standard White Metal Zinc Alloy	0.253 lb.	64.6
Brass Castings	0.2996 lb.	70 to 75
Aluminum Castings	0.092 to 0.115 lb.	60.5
Gray Iron	0.2602 lb.	149
Malleable Iron	0.2676 lb.	121
Bronze Castings	0.3032 lb.	165
Soft Steel	0.2728 lb.	156 to 212
Hardened Steel	0.2728 lb.	212 to 275

†For special requirements Tenso Alloys as light as 0.193 lb. per cubic inch, and of Brinell Hardness as high as 95 can be supplied.

B. B. & S. also produce Die Castings of standard white metal and tin-base alloys and can develop to order alloys to meet any special requirements.

Digitized by Google

DOEHLER DIE-CASTING CO.

MAIN OFFICE AND EASTERN PLANT: BROOKLYN, N. Y.

CENTRAL PLANT: TOLEDO, OHIO — WESTERN PLANT: CHICAGO, ILL.

Producers of Die Castings in Aluminum and White Metal Alloys, "Do-Di" Finished Brass Castings, and Babbitt Lined Bronze and Aluminum Back Bearings

Quality:

The prime requisites of die castings are accuracy, strength and uniformity. There must be no imperfections. Doehler Die Castings meet these requirements fully. Doehler engineering and manufacturing methods represent the highest development of the industry.

Service:

The Doehler Company is the world's largest manufacturer of die castings. Its plants are equipped and manned to give exceptional service. Orders for die castings in small or large quantities can be executed promptly.

Economy:

Doehler Die Castings are the least costly in the final reckoning. Their high quality and the absolute reliance that can be placed on them make them the most economical to purchase.

Evidence:

The Company will appreciate an opportunity of presenting figures from the experience of many, showing the savings that have been effected. The Company's engineers stand ready to advise you regarding the possible economies in your own manufacturing proposition.

SEE OUR ADVT. IN MECHANICAL ENGINEERING THE JOURNAL OF THE A.S.M.E.

Aluminum and White Metal Die Castings:

The Company is prepared to design and manufacture die-cast parts of aluminum, zinc, tin or lead base alloy composition. The Company stands ready to warrant that die castings, whose design and composition are approved by its engineers, will give you full service satisfaction.

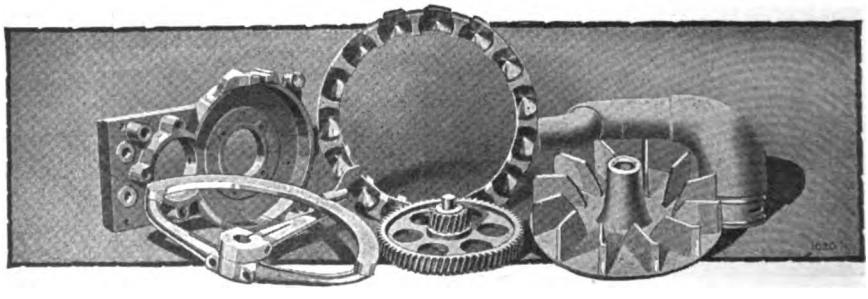
The Doehler standard of manufacture is a guarantee of a uniform product. Only virgin metals are employed in making Doehler alloys and their adherence to an absolute standard is guarded by careful checking at all stages. Doehler dies, die-casting machines and workmen are the best of their kind.

Our descriptive literature will be gladly sent to those interested.

"DO-DI" Finished Brass Castings:

The patented "Do-Di" process places at your disposal accurate finished brass castings. Smooth surface, sharp outlines, homogeneous structure, cast holes or screw threads and quantity production to limit measurements make "Do-Di" Castings the means of effecting far-reaching economies.

Let "DO-DI" Finished Brass Castings catalogue tell you the story and point out their wide adaptability.

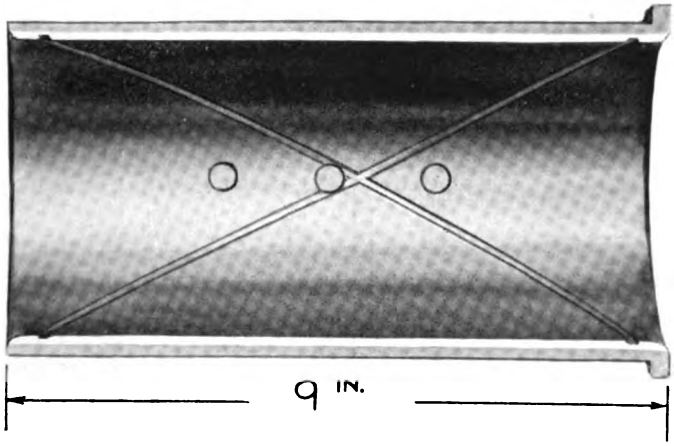


Digitized by Google

MILWAUKEE DIE CASTING CO.

297 4TH ST., MILWAUKEE, WIS.

Manufacturers of Die Moulded Castings in Zinc, Tin and Lead base alloys. Also Bronze Back Babbitt Lined Bearings and Brass Castings



BRONZE BACK BABBITT LINED BEARINGS:

We maintain complete BRASS FOUNDRY, MACHINE SHOP, and BABBITTING DEPARTMENTS devoted exclusively to the manufacture of **Bronze Back Babbitt Lined Bearings, Solid Babbitt Bearings, and Bronze Bushings.** By our special process, we have attained a perfection in the manufacture of Babbitt Lined Bearings second to none. *The Babbitt and Bronze are united as one metal,* porosity is entirely eliminated, accuracy of machining is guaranteed; resulting in a Bearing perfect in every respect.

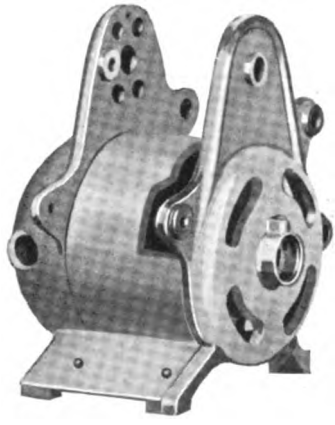
SOLID BABBITT BEARINGS:

We also have perfected a **solid Babbitt Bearing,** absolutely free from shrinkage spots or air holes.

DIE MOULDED CASTINGS:

Manufacturers are constantly finding new uses for our **Die Castings.** They eliminate machining, are smooth, free from burrs, polish easily, and take an excellent plate or lacquer.

Our Engineering Department is at your disposal to render you estimates or advice in regard to your intricate parts.



Die Cast Motor Case

Digitized by Google

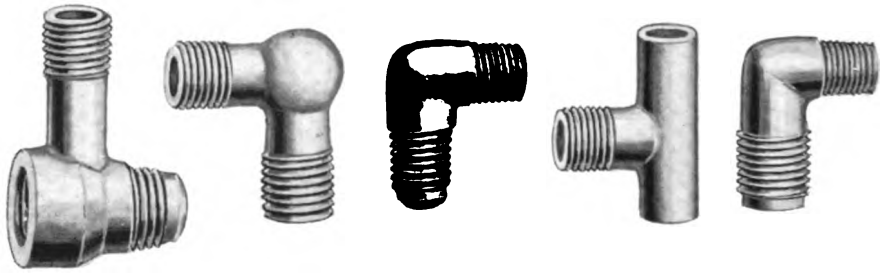
MUELLER METALS CO.

PORT HURON, MICH.

Makers of "Red-Tip" Brass Rod; Brass and Copper Tubing; Forgings and Castings in Brass, Bronze and Aluminum; Die Castings in White Metal and Aluminum; also Screw Machined Products

H. MUELLER MFG. CO., DECATUR, ILL., AND SARNIA, ONT.

Makers of Water, Plumbing and Gas Brass Goods and Tools



Mueller Brass Forged Fittings

MUELLER BRASS FORGINGS:

MUELLER BRASS AND BRONZE FORGINGS are made in dies under a pressure of 200 tons. The result is a metal of great density and tensile strength.

MUELLER BRASS AND BRONZE FORGINGS when substituted for sand castings increase production because with them there is less metal to remove—they are free-cutting and uniform—their exact dimensions save chucking time—tools stand up three times as long without grinding—rough machining operations are eliminated—and with them machine work is 25% faster.

MUELLER BRASS AND BRONZE FORGINGS also are more economical than sand castings because they wear longer—you pay for less scrap metal—you get more pieces per pound—you pay for no defective pieces—your labor costs are lowered and their original cost to you is materially less.

Literature on our Forgings and Forging Process will be sent on application.

ROD AND TUBING:

"RED-TIP" brass and copper seamless tubing, "RED-TIP" brass rod and "BLUE-TIP" bronze rod are products of the highest skill and contain metals of the purest qualities. Rigid 100% inspection, together with close supervision by a physical and chemical laboratory make our rod and tube the most desirable for all purposes.

SCREW MACHINE PRODUCTS:

MUELLER makes screw machine parts to your specifications up to a tolerance of one one-thousandth of an inch.

SAND AND DIE CASTINGS:

MUELLER makes sand castings in brass, bronze and aluminum and die castings in white metal and aluminum. No design is too intricate for us to produce accurately and promptly.

Send your specifications or samples and blue prints for our quotations.

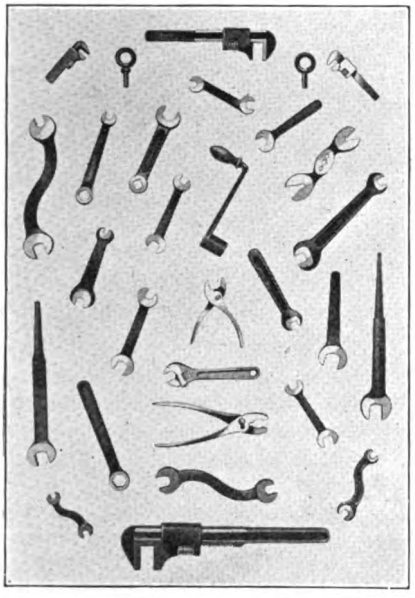
"Three generations of work well done."

Digitized by Google

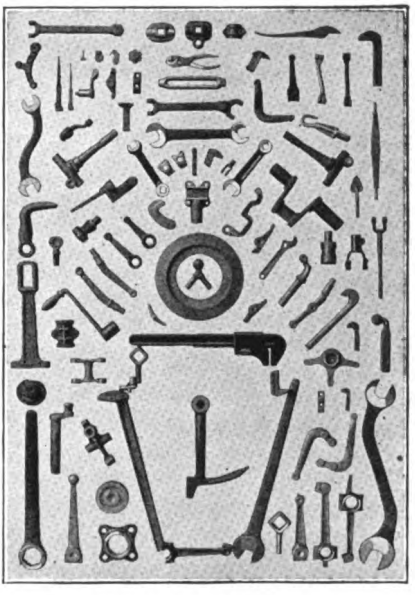
LAKESIDE FORGE COMPANY

ERIE, PENNSYLVANIA

Manufacturers of Drop Forgings and Wrenches



Standard Stock Line



Special Forgings to Order

LAKESIDE DEPENDABLE DROP FORGINGS, WRENCHES, AND PLIERS:

Our line embraces the following types:

Drop Forged Wrenches in a complete assortment of sizes and styles, ranging in opening sizes from $\frac{5}{16}$" to 3⅞", including wrenches for U. S. Standard, Hexagon nuts, Hexagon cap screws, set screws, S.A.E., Witworth and Metric Standard. Special sizes and shapes to order.

Auto, Truck, Industrial and Bicycle **Adjustable Wrenches.** In length sizes from 4¼" to 18".

LACO 22½° angle adjustable wrench—length sizes 4" to 12".

Lakeside Combination Slip Joint Pliers. 5", 6", 8" 10" sizes. Plain and knurled handles.

Lakeside tools are forged from carefully selected steel, are absolutely accurate in size, and are carefully finished in such a manner as to produce tools which are unusually well finished as well as unbreakably tough and strong. Semi and finished are thoroughly heat treated and case hardened.

Eyebolts furnished either plain or shouldered; plain or threaded. Stock sizes ⅜" to 1¼". Special sizes to order.

Crank Handles broached ½" to 1⅛".

Special Forgings to order. Our equipment consists of complete batteries of hammers ranging in weight from 600 pounds to 2500 pounds, both "board drops" and "steamers." Our die department, as well as our hammer shop, is equipped with the latest and most modern equipment. Its facilities enable us to produce forgings from the most intricate dies promptly and efficiently. We are prepared to do accurate heat treating.

Catalogue "Q" just off the press. Copy will be gladly sent upon request.

Digitized by Google

THE AMERICAN FORGE & MACH. CO.

CANTON, OHIO

Manufacturer of Steel Forgings

PRODUCTS:

Drop and Drawn Forgings from 2 ounces to 30,000 pounds.

All sizes of Crane Hooks.

Bridle and Porter chains for heavy hoisting.

Links and pins are made of Chrome-Vanadium steel, carefully heat-treated, making the most satisfactory and lasting chain material known.

Tinning and Galvanizing Rolls.
Annealing Box Hooks.
Gear Blanks.
Rider Blocks.
Hot Mill Screws and numerous other mill forgings.

DRAWN FORGINGS:

A few examples of the forgings we are equipped to produce are shown on these pages.

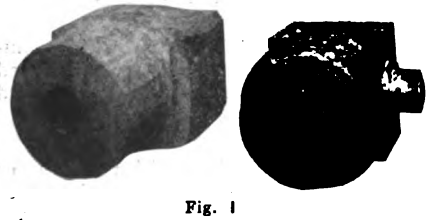


Fig. 1

Fig. 1 illustrates two trench mortar forgings, one as forged, the other rough machined. These were made for the U. S. Government and weighed, when finished, 320 lbs. each. They were made of the best alloy steel and heat treated.

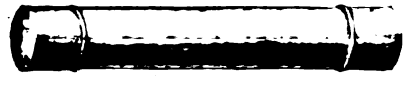


Fig. 2

Fig. 2 shows a locomotive driving axle, the finished weight of which is 1800 pounds.



Fig. 3

Fig. 3 is a good example of Hook Beam or Crane Forging weighing 50 to 500 pounds each.

Forgings made by us can be delivered to you smooth forged, or rough machined.

We will gladly undertake the forging of a single repair part or supply you with forgings on a quantity production basis for manufacturing purpose.

Hot Mill Screws:

There are but few, if any, machine parts that must stand up under such a trying service as Hot Mill Screws. Our screws will outlast several ordinary screws for we have made a special study of the metallurgical requirements necessary to withstand the severe service.

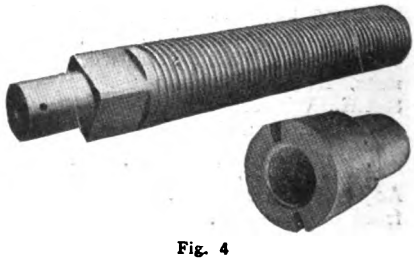


Fig. 4

Since we have specialized in these better housing screws and boxes, we are prepared to meet your particular needs with dispatch. They save many shut-downs due to replacements and the cost of lost production and new ordinary screws.

Digitized by Google

THE AMERICAN FORGE & MACH. CO. CANTON, OHIO

DROP FORGINGS:

We direct your attention to the workmanlike finish and clean-cut appearance of the drop forgings shown on this page. It is our aim and pride to produce the best forgings obtainable.

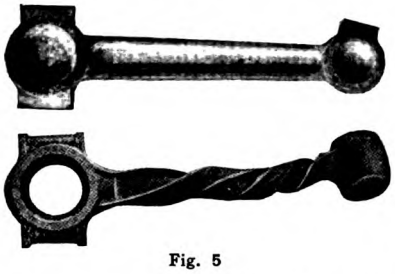


Fig. 5

Fig. 5 illustrates two examples of connecting rod forgings. Produced in large numbers for automobile truck motors. The lower one has been twisted cold after being heat-treated.

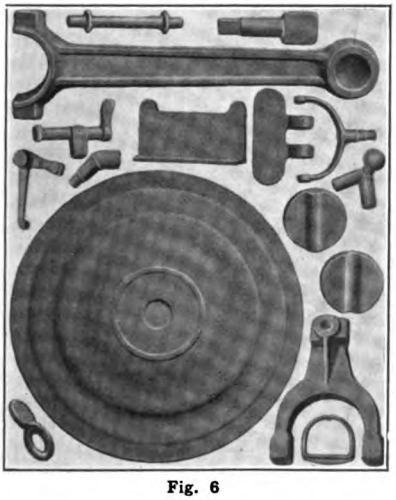


Fig. 6

Fig. 6 presents a group of drop forgings consisting of some very difficult shapes. These include the connecting rod; the large fly-wheel; balloon hangars furnished the U. S. Government, Bureau of Aircraft Production; rocker arms furnished for the Liberty motors which were made of the best alloy steel and had to pass a most rigid inspection.

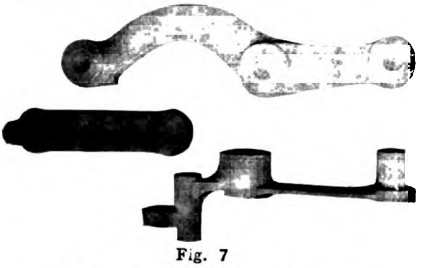


Fig. 7

Fig. 7 shows three rather difficult and intricate drop forgings made for locomotive valve gear. The top forging weighs approximately 120 pounds, the second about 30 pounds and the lower forging 70 pounds.

FACILITIES AND EQUIPMENT:

To produce these forgings we have built up one of the best and most modern plants in our field. Our Drop Forge Plant includes steam drop hammers from 1200 to 5000 pounds, to which may be added a well equipped Drawn Forge Plant where are located two Steam Hydraulic Forging Presses.

Our machine shop is equipped with saws, lathes, boring mills, planers, shapers, etc., whose capacity is ample to take care of forgings weighing thousands of pounds.

Our heat-treating plant is one of the most modern in the country with regard to its equipment and is backed by experts in this art. This plant has been meeting the United States Government requirements on gun work as to heat treatment which is a paraphrase for excellent and accurate work.

SERVICE:

We are continually experimenting with and improving upon methods and processes of forging and heat-treating. All the valuable experience gained by our engineers and chemists reverts to our customers. Consult with our engineers concerning your forging propositions and let us solve your difficulties.

SEE OUR ADVTS. IN MECHANICAL ENGINEERING THE JOURNAL OF THE A.S.M.E.

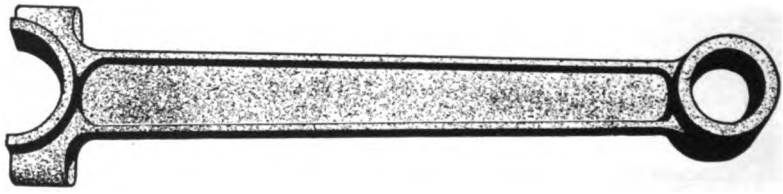
Digitized by Google

TRANSUE AND WILLIAMS STEEL FORGING CORPORATION

ALLIANCE, OHIO

BRANCH OFFICES: J. P. HILANDS, 2 Rector St., New York, N. Y. H. T. BARBER, 201 Ford Bldg., Detroit, Mich.

Manufacturers of High Grade Forgings and Sheet Metal Stampings



DROP FORGINGS:

We maintain a most thoroughly up-to-date plant with the best equipment for the production of drop forgings of all classes.

Do you know that "Transue and Williams" DROP FORGINGS are always superior to Malleable or Steel Castings—and that they cost no more?

From the smallest to the largest, we make everything for which Drop Forgings are required:—for *automobiles, agricultural implements, ice machines, locomotives, railway cars,* etc.

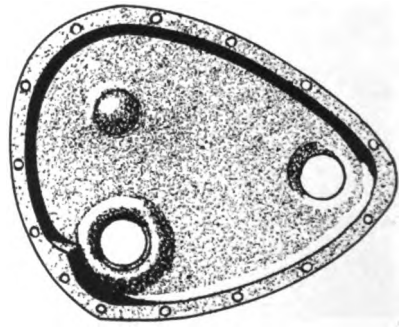
We are anxious to have you give us a trial.

Send us the specifications for your next requirements.

HEAT TREATING:

Complete equipment for the proper heat treatment of Forgings requiring heat treatment.

SHEET METAL STAMPING:



Deep drawn work for passenger cars, tractors, trucks, electric apparatus and fixtures, machine tools.

Hub flanges, brake drums, step hangers, clutch cones, housing and gear covers, Reflectors, table tops, oil pans.

Equipped to assemble any Parker Process engine bases, oil pans, gear covers, and special units.

Vitreous Enameling.

Send us your print for estimate.

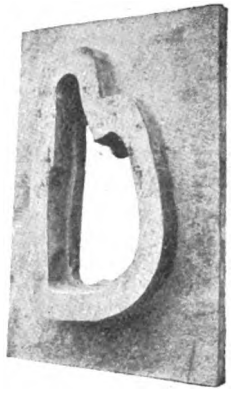
Digitized by Google

VULCAN STEAM FORGING CO.

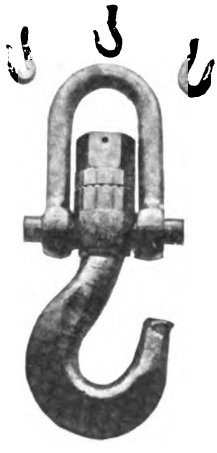
247 RANO STREET, BUFFALO, N. Y.

Makers of High Grade Forgings

The result of *Vulcan Forgings* is our success. We tender to you in your requirements of Tool Steel Die Makers Forgings, the results of many years of successful experience. We produce smooth forged Crucible Tool Steel Cutting and Draw Die Weldless Rings, Cams, Composite Dies and Punches, Shear Blades, Circular Cutters, and every other type of Forging used by Die Makers. These steels are straight carbon, alloyed and non-warping, depending upon the service required.

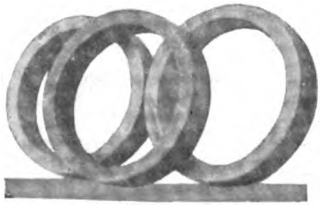


For Gears, Axles, Spindles, Reamer and Tap Bodies, or other Machine Parts requiring hardness, rigidity, and resistance to fatigue, our Alloy Steels by recommended treatment will give unexcelled results.



Crankshafts, Spindles, Rolls, Levers, Cutterheads, Camshafts, Cams, Gauge Rings, Gear Blanks, and other Machine Parts can be quickly furnished of Machinery Steel in any required analysis.

Our Ball Race Ring Forgings are forged from the highest quality of Special Steel, and are used exclusively by established ball bearing manufacturers—we can as efficiently serve you.



Fortify the quality of your product by the adoption of *Vulcan Forgings.*

The base of every *Vulcan Forging* is Quality, not lessened by our ability to facilitate quick delivery.

Digitized by Google

GEUDER, PAESCHKE & FREY CO.

WESTERN VALLEY, MILWAUKEE, WIS.

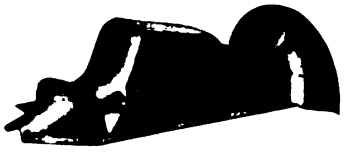
Contract Manufacturers of Light and Heavy Sheet Metal Parts

G. P. & F. SERVICE:

Drawing		Stamping
Punching		Spinning
Forming	and	Blanking

In aluminum, brass, copper, sheet steel, tin plate and sheet zinc.

Gas Welding	Electric Welding
Hot Tinning	Hot Galvanizing
Japanning	Porcelain Enameling



Crank Case

We are specialists in the art of sheet metal stamping.

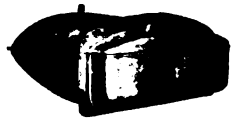
The illustrations show some idea of the variety of difficult work we can do. Some of these parts were formerly cast metal; others replace wood.



Welded Joint Steel Tank

We demonstrated that these parts could be more cheaply produced as sheet metal parts, drawn, stamped or spun. The quality and strength of the parts were improved and the attractive finish possible frequently added to its sales value.





Drawn Steel Lock Seamed Gas Tanks





Porcelain Steel Ware

With 40 years of experience in drawing, spinning, forming, punching and stamping and complete modern equipment, we are sure we can give you some interesting figures. Send us a sample part or a blue print and our estimate will convince you that we can make sheet metal parts even cheaper than you could in your own plant. And our equipment and specialized training will produce better parts too.

"Over 15 acres of floor space—
Knowing How Since '81."

Digitized by Google

Metal Working Machinery, Machine Tools and Accessories

EQUIPMENT CATALOGUED IN THIS DIVISION

Data begins on page number given, as closely as can be divided. Consult Directory Section (green pages) for specific products.

	PAGE		PAGE
Abrasives	510	Nuts	522
Acetylene Generators	541	Ovens	534
Bolts	522	Oxygen Generating Plants	536
Boring Mills	467	Planers	469
Broaching Machines	461	Presses	437
Burners, Oil (Industrial)	530	Punching Machines	438
Chucks	512	Reamers	502
Clamps, Machine Table	515	Rivets	521
Cutters	503	Rolls, Forming	443
Die Heads	496	Saws	506
Die Sinking Machines	493	Screw Machine Products	518
Dies and Punches	505	Screw Machines	462
Drill Heads, Multi-spindle	500	Screw Thread Comparators	453
Drilling Machines	466	Screws	520
Drills	502	Shapers	470
Flanging Machines	445	Shearing Machines	440
Furnaces, Industrial	527	Slitting Machines	491
Gages	471	Slotting Machines	468
Gear Cutting Machines	472	Springs	519
Grinding Machines	484	Stamps, Steel	514
Grinding Wheels	510	Taps, Collapsing	498
Hammers, Power	438	Threading Machines	496
Hobs	503	Tools, Machinists'	508
Hydrogen Generating Plants	536	Welding Machines	537
Lathes	447	Wrenches	516
Milling Machines	477		

See next page for list of firms catalogued

CATALOGUE SECTION

PART VI **Pages 435-541**

Digitized by Google

INDEX TO FIRMS CATALOGUED IN PART VI

A — PAGE

American Gas Furnace Co. 527
American Industrial Furnace Corp'n..... 528
American Metal Treatment Co..... 535
American Screw Co..... 520
Anthony Co..... 530
Atkins, E. C. & Co. 506
Atlas Press Co. 437
Automatic Products Corp'n 518

B

Barber-Colman Co.....474, 475
Barnes, Wallace Co..... 519
Bastian-Blessing Co..... 539
Bertsch & Co..... 442
Best, W. N. (Inc.)..... 531
Blake & Johnson Co..... 491
Blanchard Machine Co..... 484
Bliss, E. W. Co.....438, 439
Bradley, C. C. & Son (Inc.)..... 446
Brown & Sharpe Mfg. Co..... 477
Bryant Chucking Grinder Co..... 485

C

Champion Rivet Co..... 521
Cleveland Automatic Machine Co..... 462
Cleveland Twist Drill Co..... 502
Colburn Machine Tool Co.....466, 467
Columbus Bolt Works Co..... 522

D

Diamond Expansion Bolt Co..... 526
Dill, T. C. Machine Co. (Inc.)..... 468
Dove-Smith & Son..... 492
Drake Lock-Nut Co..... 523

E

Electrolabs Co..... 536

F

Fellows Gear Shaper Co.....472, 473

G

Geometric Tool Co.....498, 499

H

Heald Machine Co.....486, 487
Hercules Machine & Tool Co. (Inc.)..... 476
Hoggson & Pettis Mfg. Co.....512, 513, 514

I

Illinois Tool Works..... 503
Ingersoll Milling Machine Co..... ...478, 479
International Machine Tool Co.. .....448, 449

J

Jones & Lamson Machine Co.....
.....450, 451, 452, 453, 454

K

Kearney & Trecker..... 480
Keller Mechanical Engraving Co..... 493
Kempsmith Mfg. Co..... 481

L — PAGE

Landis Machine Co. (Inc.).....496, 497
Landis Tool Co..... 488
Liberty Machine Tool Co..... 469
Long & Allstatter Co.....440, 441
Lowell Wrench Co..... 516

M

McCabe Mfg. Co..... 445
Marchant, Geo. F. Co..... 505
Maxon Furnace & Engineering Co.....532, 533
Milburn, Alexander Co..... 540
Millholland Machine Co..... 455

N

National Acme Co.....464, 465
National Tool Co..... 504
Nelson-Blanck Mfg. Co.....500, 501
New Britain Machine Co..... 463
Niagara Machine & Tool Co..... 443
Niles-Bement-Pond Co..... 470
Noble & Westbrook Mfg. Co..... 494
Norton Co.....489, 510

O

Oilgear Co..... 483
Oven Equipment & Mfg. Co..... 534

P

Porter-Cable Machine Co..... 460
Pratt & Whitney Co..... 471

Q

Quasi-Arc Weldtrode Co. (Inc.)..... 538
Quickwork Co..... 444

R

Reed & Prince Mfg. Co..... 524
Rockwell, W. S. Co..... 529
Russell, Burdsall & Ward Bolt & Nut Co . 525

S

Simonds Mfg. Co..... 507
Smalley-General Co. (Inc.)..... 482
Smith's Inventions (Inc.)..... 541
Standard Shop Equipment Co..... 515
Starrett, L. S. Co..... 508
Steinle Turret Machine Co..... 447
Sterling Grinding Wheel Co..... 511

T

Velco Mfg. Co. (Inc.)..... 461
Victor Saw Works..... 509

W

Warner & Swasey Co.....456, 457
Whitney Mfg. Co..... 495
Williams, J. H. & Co..... 517
Wilmarth & Morman Co..... 490
Wilson Welder & Metals Co. (Inc.)..... 537
Wood Turret Machine Co.....458, 459

Digitized by Google

ATLAS PRESS COMPANY

2000 N. PITCHER ST., KALAMAZOO, MICH., U. S. A.

Manufacturers of Atlas Arbor Press (Hand and Power)

EFFICIENT ARBOR PRESS EQUIPMENT:

ATLAS PRESSES are built in all sizes and types for driving mandrels, bending and straightening, broaching, embossing with dies, setting bushings, etc. In fact, all work requiring pressure up to 25 tons and centering capacity up to 38 inches may be done quicker and easier on our *Compound Presses* than by any other method.

Pinions are cut from forgings of Chrome Vanadium—Rams from specially treated Chrome Nickel. All parts designed to give highest degree of efficiency under all service conditions. *Complete details upon request.*

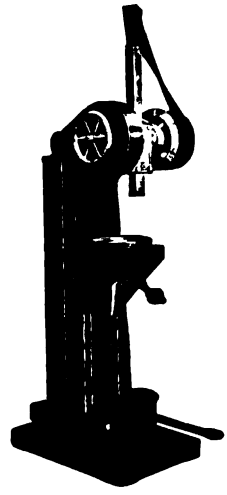
Carried in stock by leading machinery dealers everywhere.



No. 24 Press

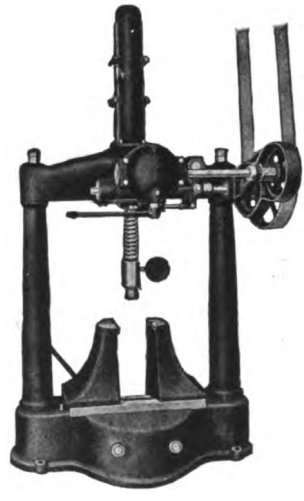
Atlas Hand Operated Arbor Presses are built in all sizes and types for accomplishing all work up to 25 tons and for centering capacity up to 38 inches.

All sizes are built of materials to give a maximum efficiency under all conditions.



No. 55 Power Press

For quick operations on production work No. 55 Press is exceptionally efficient.



No. 76 Power Press

A heavy duty powerful press giving from 30 to 40 tons pressure.

Digitized by Google

E. W. BLISS CO.

MAIN OFFICE: BROOKLYN, N. Y., U. S. A.

SALES OFFICES

CHICAGO · BUFFALO · DETROIT · PITTSBURGH · CLEVELAND · CINCINNATI · NEW HAVEN · ST. LOUIS · PARIS · LONDON

AMERICAN FACTORIES

BROOKLYN, N. Y. · CLEVELAND, OHIO · HASTINGS, MICH. · SALEM, OHIO

PRESSES, DIES, SHEARS, DROP HAMMERS, DOUBLE SEAMERS, SPECIAL MACHINERY

1857 BLISS 1921

Tin and Enamel Ware Machinery

Metal Package Machinery

Automatic Tin Can Machinery

Electrical Parts Machinery

Automobile Parts Machinery

Drop Forging Machinery



"BLISS" INCLINABLE POWER PRESSES: 18 sizes, weighing from 500 to 8,000 lbs., either as "Flywheel" or "Geared" Presses. Adapted for tin, sheet brass, sheet steel work, etc.



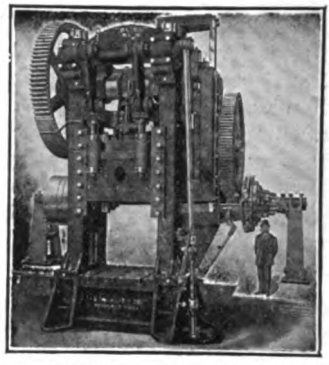
"STILES" AUTOMATIC DROP HAMMERS: Built in 15 sizes. Adapted for forging or stamping. Hammers weigh from 100 to 3000 lbs.

"BLISS" DOUBLE SEAMERS (not illustrated):

Built in over 30 different types and sizes, weighing from 275 to 7,500 lbs. For double seaming the tops and bottoms on articles of square, round, oval and irregular shapes.

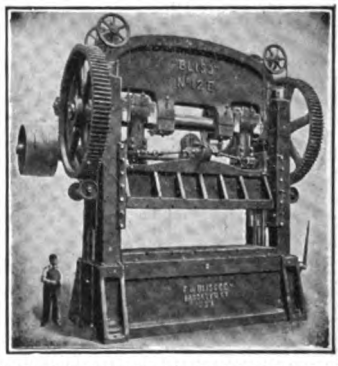
"STILES" PUNCHING PRESSES (see opposite page):

11 sizes, weighing from 550 to 13,000 lbs. Adapted for the manufacture of general hardware, electrical goods, etc.



"BLISS" TOGGLE DRAWING PRESSES:

Built in over 20 sizes, weighing from 5,600 to 165,000 lbs. For drawing shells from all kinds of sheet metal.



"BLISS" STRAIGHT-SIDE DOUBLE CRANK PRESSES:

Built in over 150 different types and sizes, weighing from 2,500 to 260,000 lbs. For heavy blanking, stamping and punching of large dimensions.

"BLISS" KNUCKLE JOINT EMBOSSING PRESSES (see opposite page):

Built in 12 sizes and various styles, weighing from 2,700 to 110,000 lbs. and capable of exerting pressures ranging from 30 to 1,500 tons.

"BLISS" AND "STILES" OVERHANGING DOUBLE-CRANK PRESSES (not illustrated):

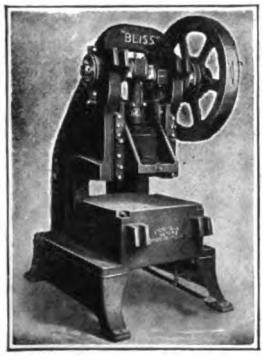
Built in over 100 different types and sizes, weighing from 2,300 to 280,000 lbs. For heavy blanking, stamping and punching of large dimensions, etc.

Catalogue of any line of our machines sent on request.

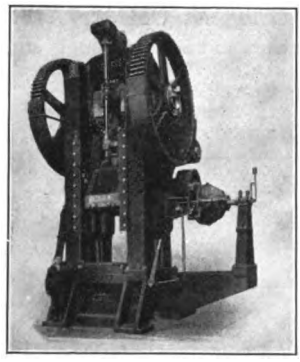
SEE OUR ADVTS. IN MECHANICAL ENGINEERING THE JOURNAL OF THE A.S.M.E.

Digitized by Google

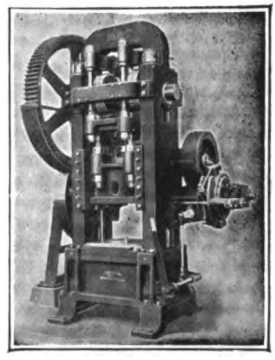
E. W. BLISS CO. BROOKLYN, N. Y., U. S. A.



Cut Back Frame



Straight Side Press

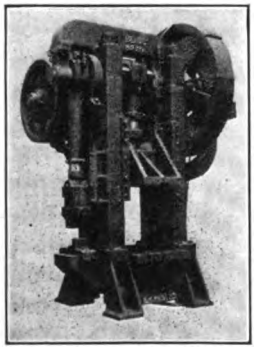


Double Action Cam

Our Product Includes MACHINERY AND DIES for the Economical Manufacture of the Following Sheet Metal Goods:

Agricultural Implements
Albums
Aluminum Ware
Armature Disks and Segments
Automobile Parts
Bicycle Parts
Bird Cages
Bottle Caps and Capsules
Brass Goods
Brittania Ware
Buckles
Burners
Butter Tins
Cash Registers
Cigarette Boxes
Clocks
Coal Hods
Collapsible Tubes
Cooking Utensils
Coins
Cornice Work
Cuspidors
Cutlery
Dental Instruments
Dinner Pails
Drip Pans
Door Knobs
Drop Forgings
Druggists' Tinware
Dust Pans
Electrical Goods
Elevator Buckets
Enamel Ware
Expanded Metal Laths
Fish Cans
Forks
Fruit Cans
Fry Pans
Furniture (Metal)
Gas Fixtures
Gas Ranges
Gongs
Gun Parts
Hammers
Hardware
Harness Trimmings
Hinges
Horse Shoes
Jewelry
Kitchen Boilers
Kitchen Utensils
Lamps
Lanterns
Lard Pails
Locks
Match Boxes
Meat Cans
Medals
Metallic Ceilings
Metal Laths
Metal Radiators
Musical Instruments
Oil Cans
Oil Stoves
Perforated Metal
Paint Cans
Paint Tubes
Petroleum Cans
Pick-eyes
Pieced Tinware
Plated Ware
Playing Cards (Cutting)
Powder Kegs
Range Boilers
Range Parts
Reflectors
Refrigerators
Roofing
Rubber Cups
Satchel Frames
Speaking Tubes
Silver Ware
Sheet Steel Sinks
Shingles (Medal)
Shovels
Spoons
Sheet Steel Stoves
Steel Barrels
Stove Trimmings
Thimbles
Tin Boxes and Cans
Tobacco Boxes
Toys
Trunk Trimmings
Typewriters
Vapor Stoves
Varnish Cans
Vegetable Cans
Water Coolers
Water Pails
Watches
Wash Tubs
Zinc Work

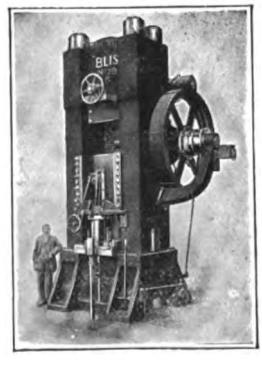
And Many Other Staple and Special Lines of Goods.



Trimming Press



"Stiles" Deep Throat



Knuckle Joint

Digitized by Google

THE LONG & ALLSTATTER CO.

AMERICAN PUNCH & SHEAR WORKS

Established 1856 — Incorporated 1878

HAMILTON, OHIO, U. S. A.

Manufacturers of Vertical Punches and Shears (Single and Double Ended), Horizontal Punches, Multiple Punches, Splice Bar Punches and Shears, Gate or Guillotine Shears, Bar Iron Shears, Angle Iron Shears, Plate Splitting and Crosscutting Shears, Alligator Shears, Horizontal Bending and Forming Machines or "Bulldozers," Board Drop Hammers, Cushioned Helve Hammers, Spacing Tables, Etc.

VERTICAL PUNCHES AND SHEARS:

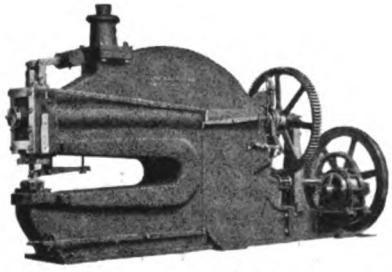


Fig. 1303—No. 1 Single Machine

A complete line of open throated, single and double ended machines, made in various sizes ranging in capacity from the smallest to the most powerful types, with throat depths varying from 12″ up to 84″. The form of the lower jaw on these machines can be modified so as to adapt them for punching structural shapes, etc. By changing tools these machines can be used either for punching or shearing.

SEE OUR ADVTS. IN MECHANICAL ENGINEERING THE JOURNAL OF THE A.S.M.E.

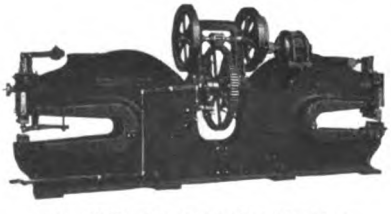


Fig. 1369—No. 2 Double Machine

SHEARING MACHINES:

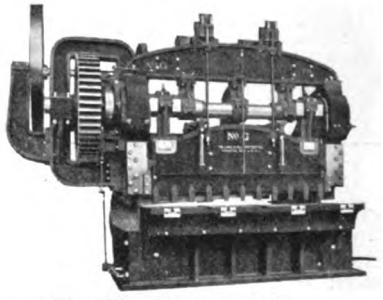


Fig. 1513—No. G. Gate Shear

Varying in width between housings and depth of throat; and made in sizes to cut off and trim from ¼″ to 1¾″ thick plates.

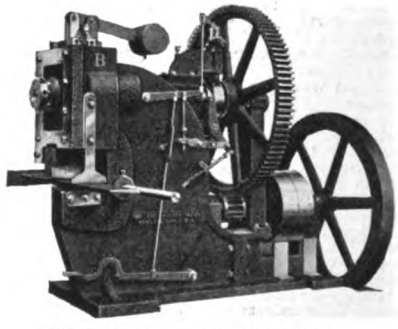


Fig. 874—No. B Bar Iron Shear

Made in different sizes, and designed for shearing flat and round bars, and angles.

These machines are also made in different sizes to cut from the smallest to the largest angles, cutting them off square or to a miter of 45 degrees.

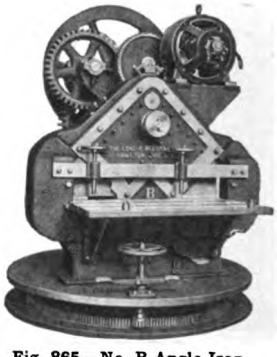


Fig. 865—No. B Angle Iron Shear on Turn-table

Digitized by Google

MULTIPLE PUNCHES:



Fig. 1406—No. C Multiple Punch

These machines are designed to punch a number of holes at a time in rows or groups and are made in various widths between housings. Hand or automatic feed spacing tables may be attached to machines of this kind when desired.

HORIZONTAL MACHINES:



Fig. 1443—No. 1 Horizontal Punch and Bender

These machines are designed to punch, bend or straighten flanged work and structural shapes, such as I-beams, channels, angles, etc. Made single and double ended.

STRUCTURAL PUNCHES:

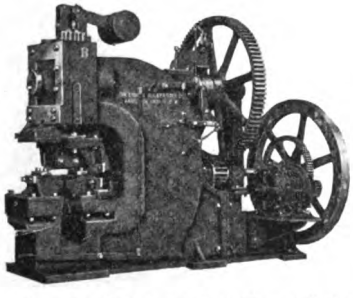
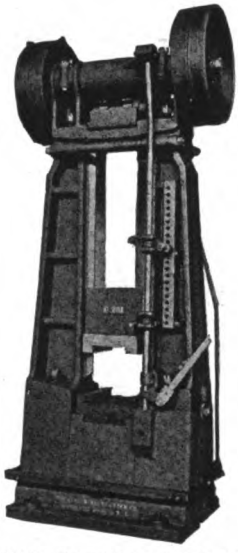


Fig. 1428—No. B I-Beam Punching and Coping Machine

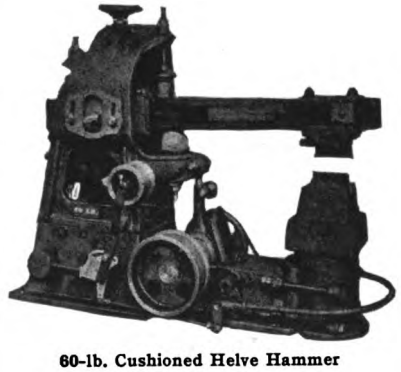
These machines are made with slot in the lower jaw, to punch and cope structural sections, such as I-beams, channels, angles, etc.

HAMMERS:



600-lb. Board Drop Hammer

Made in a variety of sizes to meet the requirements of modern drop forge, agricultural, stamping and numerous other trades. Write for Bulletin BDH-A.



60-lb. Cushioned Helve Hammer

Made in 25 to 100 lb. sizes. Adapted for all classes of work, from plain drawing out to difficult semi-drop forging work. Write for Bulletin RCH-1.

Let us know your requirements and we will be glad to specify the size and type of machine best suited for your work.

Digitized by Google

BERTSCH & COMPANY, INC.

Established 1879 **Incorporated 1911**

CAMBRIDGE CITY, INDIANA

Manufacturers of Machinery for Sheet Metal, Plate, and Structural Work

Products:

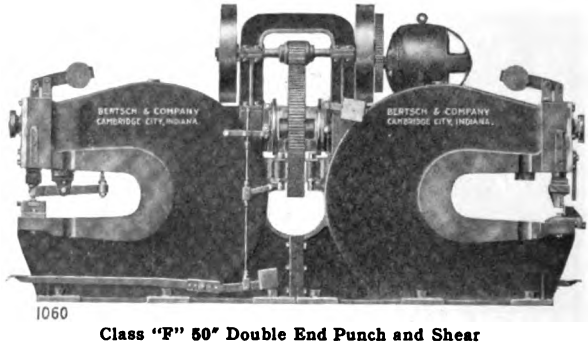
LIGHT AND HEAVY

SHEARS

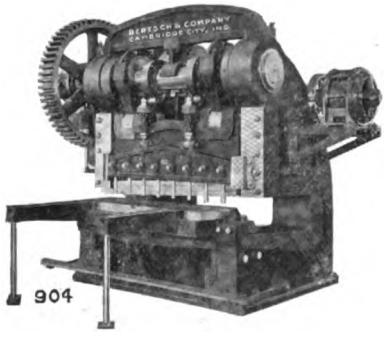
PUNCHES

ROLLS

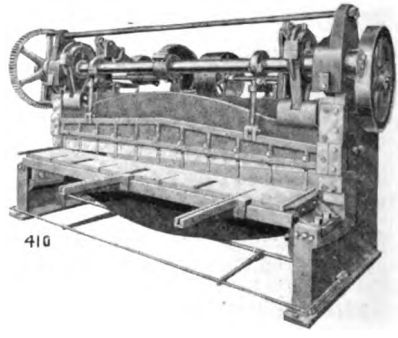
PRESSES



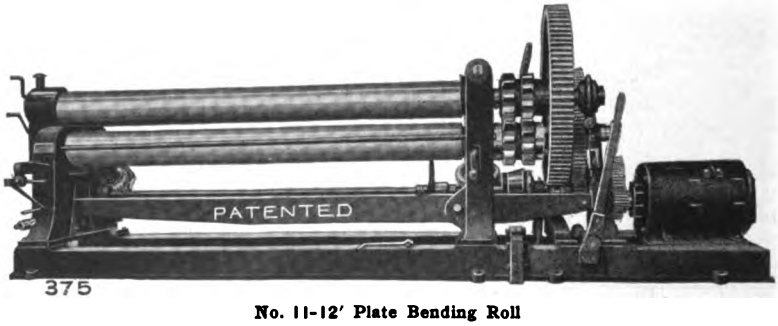
Class "F" 50" Double End Punch and Shear



No. 9-6' Gate Shear



No. 4-12' Squaring Shear



No. 11-12' Plate Bending Roll

Digitized by Google

NIAGARA MACHINE & TOOL WORKS

Established 1880

BUFFALO, N. Y., U. S. A.

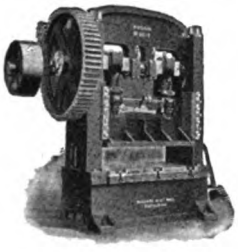
Tools and Machines for Working Sheet Metals, Presses and Punches, Power Shears, Tinsmiths' Tools, Forming Rolls, Etc.

Furnishing Tinsmiths, Sheet Iron Workers, and Sheet Metal Goods Manufacturers, the proper tools and equipment for efficient production, has been for forty years the exclusive work of this company. It offers machines for folding, bending, curving, crimping, beading, flanging, grooving, seaming, blanking, punching, perforating, forming, stamping, drawing, shearing and other operations in Sheet Metals; hand tools, hand operated, and high production machines.

Competent Engineers are at your service. Inquiries are solicited.

PRESSES:

Inclinable, Punching, Horning and Wiring, Arch, Straight Sided, Single

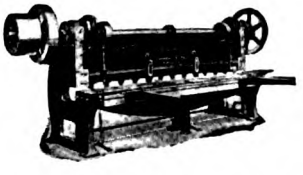


No. 615 E Press

Crank, Double Crank, Trimming, Toggle Drawing, Cam Drawing, Reducing, Screw, Foot, Drop, Bench and other types; built in sizes up to 75,000 lb. weight, for light or heavy sheet metal punching, cutting, blanking, bending, forming and drawing, also for trimming drop forgings.

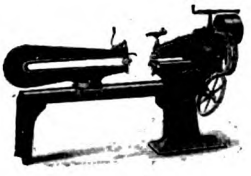
SHEARS:

SQUARING Shears, foot operated, belt or motor driven; made in a full range of



No. 8120 Shear

lengths from 2 to 16 feet, for any thickness of material up to and including three-eighths inch; with or without gap. Niagara Shears make straight, accurate cuts the full length of the Shear. The gap is necessary for shearing sheets longer than the machine.

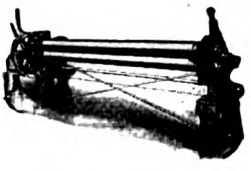


No. 16 A Ring Shear

ROTARY Shears, hand operated, belt or motor driven; built in many sizes; for light gauge, up to one-half inch capacity; with various depths of throat; in both ordinary and ring shear, or internal circle types; with circle arm for cutting discs and rings, or arranged for straight slitting, irregular cutting, etc.

FORMING ROLLS:

Our Slip Roll Formers are made in diameter 1½″ to 7″ lengths up to 10 feet; capacity up to ⅜″; for curving Sheet Metal, or forming to cylindrical shape;



6″ x 120″ Slip Roll

ordinary construction or with special features to suit requirements.

SHEET METAL WORKERS' TOOLS:

Folders, Brakes, Beaders, Crimpers, Flangers, Groovers, Double Seamers, Elbow Machines, Stakes, Snips, Bench Shears, Rivet Sets, Hand Tools, Roofers' Tools, Notchers, Lever Shears and Lever Punches, all in great variety of size and type.

Interesting deliveries.

Complete catalog upon request.

Digitized by Google

THE QUICKWORK COMPANY

ST. MARY'S, OHIO

Manufacturers of Plate and Sheet Metal Working Machinery

"QUICKWORK"

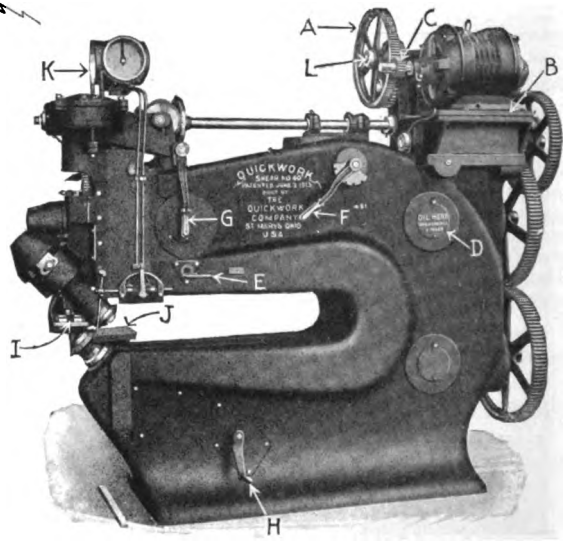
ROTARY SHEARS:

Made in 7 sizes.

Cut all gauges of sheet and plate metal up to 1 inch thick in straight or irregular shapes and openings without cutting in from the side of the sheet. Leaves square, true edge that requires no finishing. Used in building ships, boilers, tanks, cars and general plate and sheet metal work.

Save 50% to 90%:

The development of the Automatic Indicator, and its application to the "Quickwork" Rotary Shear makes the "Quickwork" a shear that *cuts straight work faster* than by any other method excepting a long bladed shear that makes the entire cut at one stroke; the "Quickwork" takes the place of all other straight bladed shears of any kind.



Patented June 3, 1913

It also does irregular cutting, taking the place of oxy-acetylene torches or the punching of a row of holes and does away with the work necessary to finish up a burned or punched cut, but the main purpose of the "Quickwork" is to *cut straight lines.*

A "Quickwork" Shear buys itself out of the saving it makes. It refunds its price in a very short time. Therefore its purchase means only a temporary investment. You soon have your money back, plus the shear, which continues to return dividends, paying for itself over and over again at short intervals so long as it is used.

We cordially invite you to call to see us at our plant or, if you desire, we will send a practical representative to see you. We will take pleasure in submitting proposals covering shears for cutting plates of any thickness you may specify up to 1".

Write for catalogue No. 60.



FIG. 1



FIG. 2



FIG. 3



FIG. 4



FIG. 5

A Few Typical Shapes and Openings that Can Be Cut on "Quickwork" Rotary Shears

Digitized by Google

McCABE MANUFACTURING COMPANY

LAWRENCE, MASS.

Manufacturers of Pneumatic Flanging Machines

THE "McCABE" PNEUMATIC FLANGING MACHINE:

Flanging with the McCabe Pneumatic Flanging Machine is the turning of the flange which eliminates any shearing action during the operation. Various shapes of flanges are secured by the use of dies which are easily applied; size of flange and range of pieces flanged can be governed by the part to be flanged.

This equipment presents a radical departure from all established and previous methods of flanging. First, in that the machine must produce a greater amount of work. Second, in that it must have a greater range. Third, in that it reduces mechanically the effort required to flange sheet metal. Fourth, in that ample power is provided under normal shop air pressure to flange metal cold up to and including ½ inch thickness.

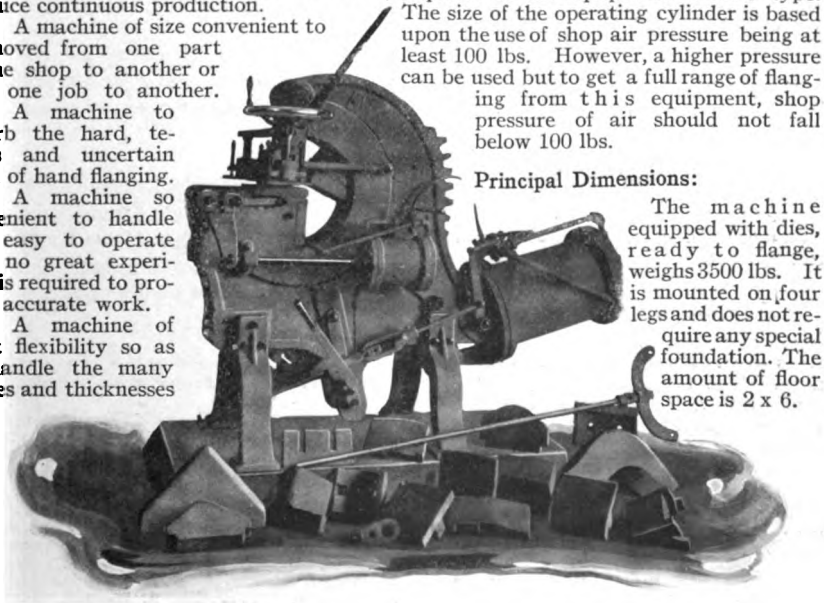
The Principle of Design of the McCabe Pneumatic Flanging Machine presents the following prime factors.

1. A machine capable of forming, shaping and flanging sheet metal cold, up to and including one-half inch in thickness.
2. A machine to flange one or many similar pieces with uniform accuracy.
3. A machine of unfailing power to produce continuous production.
4. A machine of size convenient to be moved from one part of the shop to another or from one job to another.
5. A machine to absorb the hard, tedious and uncertain work of hand flanging.
6. A machine so convenient to handle and easy to operate that no great experience is required to produce accurate work.
7. A machine of great flexibility so as to handle the many shapes and thicknesses of sheet metal used in either repairs or renewals. Ease of operation is provided for by the use of two levers. The part to be flanged is placed in the machine and securely clamped by a locking mechanism controlled by an independent air cylinder. This locking mechanism is worked by the use of one lever conveniently located for the operator. The second lever controls the movement of the piston which engages with the flange arm through a gear rack. With each machine there is furnished sufficient dies to handle the ordinary run of flanging requirements and for special parts special fixtures can be furnished to fit a sample piece. In flanging square corners it will be found that the McCabe Pneumatic Flanging Machine has ample power to gather the metal so that a neat and well fitting corner is the result. In flanging corner work it is recommended that the metal to be heated be gathered at this point.

The general construction of the McCabe Pneumatic Flanging Machine throughout is sturdy and well balanced. This insures efficiency and durability. It is constructed of such materials as have been tested and found suitable for the work required of an equipment of this type. The size of the operating cylinder is based upon the use of shop air pressure being at least 100 lbs. However, a higher pressure can be used but to get a full range of flanging from this equipment, shop pressure of air should not fall below 100 lbs.

Principal Dimensions:

The machine equipped with dies, ready to flange, weighs 3500 lbs. It is mounted on four legs and does not require any special foundation. The amount of floor space is 2 x 6.



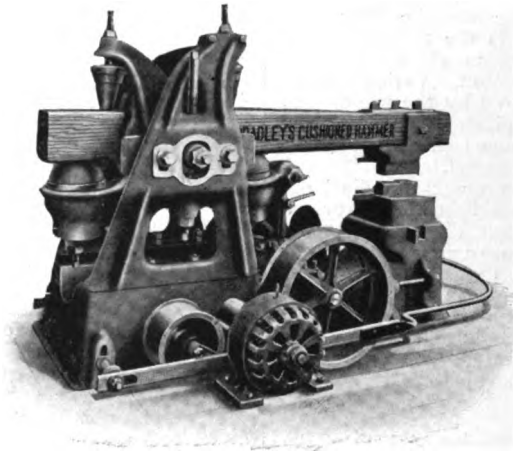
Digitized by Google

C. C. BRADLEY & SON, INC.

Established in 1832

SYRACUSE, N. Y.

Manufacturers of Bradley Cushioned Power Hammers and Forges



The Bradley Cushioned Helve Hammer with Motor Drive direct connected.

BRADLEY HAMMERS are made in Helve, Upright Strap, Upright Helve and Compact styles, with heads ranging from 15 lbs. to 500 lbs., and capable of forging iron, steel and other metals from five inches square down.

If your work is continuous, like plating, drawing, swaging, collaring, welding or spindle work, with infrequent changes in size of material, or if it is die work where perfect accuracy and the finest finish are imperative, let the Bradley Helve Hammer be your choice. No other Hammer is like it. No other Hammer can equal it.

If your work is of a general, all-around jobbing character, with frequent variations in the size of stock, or is of such a nature that the Hammer is not worked continuously, but with frequent stops, a Bradley Upright Strap Hammer may best answer the purpose.

But if the work is continuous and severe, the Hammer running without rest, hour after hour, day in and day out, the Upright Helve would answer a better purpose.

If your work is such as described last above, and your floor space is limited, but with good height, and a somewhat less first cost is an object, we suggest the Bradley Compact Hammer.

More Bradley Hammers are sold each year than of all other power Hammers combined. Separate circulars of each.

WE MAKE:

The Bradley Cushioned Helve Hammer.
The Bradley Upright Strap Hammer.
The Bradley Upright Helve Hammer.
The Bradley Compact Hammer.
Forges for Hard Coal or Coke.

FOREIGN AGENTS:

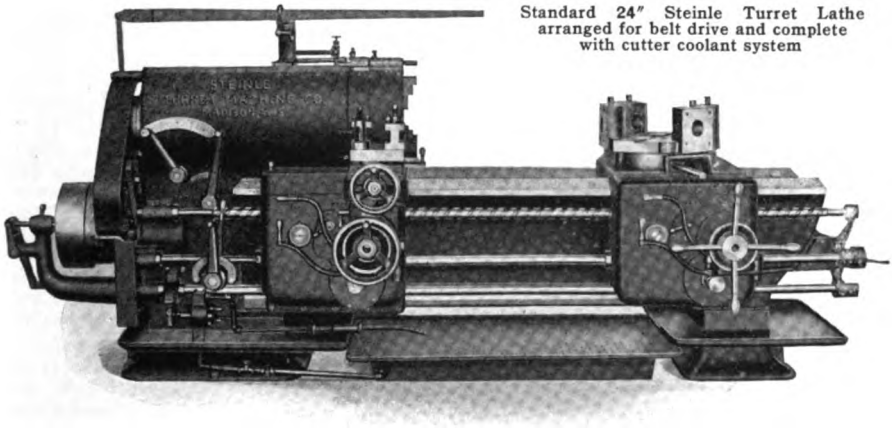
England.....Buck & Hickman, Ltd., London
France..Fenwick Freres & Co., Paris, Lyon, Rhone
Italy.....Fenwick Freres & Co., Turin
Belgium.....Fenwick Freres & Co., Liege
Brazil....Fenwick Freres & Co., Rio de Janeiro
Switzerland.....Fenwick Freres & Co., Zurich
Spain.....Fenwick Freres & Co., Barcelona
Portugal.....Fenwick Freres & Co., Lisbon
Alsace-Loraine.....Fenwick Freres & Co., Luxemburg
China..Anderssen, Meyer & Co., Ltd., Shanghai
Norway, Sweden...Chr. A. Herstad, Stockholm
Denmark.....Chr. A. Herstad, Stockholm

Digitized by Google

STEINLE TURRET MACHINE CO.

MADISON, WISCONSIN

Originators of the Heavy Duty Full Swing Side Carriage Turret Lathe



Standard 24″ Steinle Turret Lathe arranged for belt drive and complete with cutter coolant system

STEINLE 24″ FULL SWING SIDE CARRIAGE TURRET LATHE:

A modern high power heavy duty turret lathe in the design of which particular attention has been given to strength and rigidity, power, the application and rigid support of proper tool equipment, labor and time-saving features and convenience of operation.

Manufacturers of gasoline engines, alcohol or distillate engines, steam engines or pumps in sizes of 20″ cylinder bore or smaller or any class of service will find in this machine a great producer in either large or small quantities of such parts as pistons, cylinder heads, cylinders, flywheels, eccentrics, piston or bull rings, cross-heads, bonnets, valves, glands, stuffing boxes, and various other parts.

Truck and tractor parts including gear blanks from iron or steel castings, forgings, or bar stock; hubs, differential housings, axle housings, etc., can be produced economically on this machine.

General Specifications

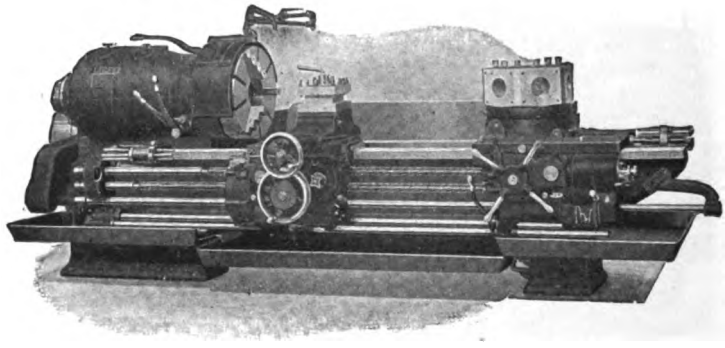
Swing-over ways	24″
Swing-over side carriage	21½″
Hole through spindle	4″ or 6¼″
Diameter of turret flats	21″
Diameter of turret face holes	3″
Traverse of turret	56″
Traverse of side carriage	56″
Reversible spindle speeds	30
Range of speeds, 4″ bore	4 to 168
Range of speeds, 6¼″ bore	7 to 168
Number of carriage feeds	64
Range of carriage feeds	.004 to .5
Number of cross feeds	64
Range of cross feeds	.002 to .25
Screw cutting range	2 to 56
Diameter of chuck	19″
R. P. M. of pulley	360
Diameter of pulley	16″
Horsepower of motor	10
Net weight, approximate	10,500 lbs.

Digitized by Google

INTERNATIONAL MACHINE TOOL CO.

1124 W. 21ST ST., INDIANAPOLIS, IND.

Manufacturers of the "Libby" Turret Lathes



"LIBBY" TURRET LATHE:

At present we are offering two sizes, our 16–18″ type "A" machine with $3\frac{9}{16}$″ hole through the spindle and our 24–26″ type "C" machine with either $4\frac{1}{2}$″ or $7\frac{1}{2}$″ hole through the spindle. The type "A" machine will swing 16″ over the tool post carriage and 18″ over the ways; the type "C" machine will swing 24″ over the tool post carriage and 26″ over the ways.

448

Design is Right: In designing, building and offering the "LIBBY" Lathe we have had in mind the following prime factors:

A line of heavy duty turret lathes capable of forming, facing, turning and boring chucked pieces up to 26″ in diameter and bar work up to $7\frac{1}{4}$″ in diameter.

An all-geared head machine with a single pulley drive.

A machine with a side carriage, permitting the full swing of the work.

A machine with flat ways so located as to receive, as nearly as possible, all the cutting strains on the flat ways.

A machine with the best relative number of feeds and speeds for maximum quantity and quality production.

A machine with all feeds for each carriage independent one of the other.

A machine with convenient power rapid traverse for each carriage, independent one of the other and of the feeds.

A machine with abundant power for pulling heavy extensive cuts.

A machine with abundant rigidity and stiffness to easily carry heavy strains and produce accurate work continuously.

A machine so convenient to handle and easy on the operator that there would be every incentive to keep the machine under cut a maximum percentage of the time, and thus give a maximum production.

We claim for the "Libby" Lathe: That the limit of its production is the limit of the ability of the cutting tools to stand up.

That it is adapted to successful, rapid, continuous service under the most severe conditions.

That it is at its best in heavy work—several broad faced or other cutting tools working at one time.

That on account of its strength, rigidity and stiffness it will produce work free from chatter with smooth, accurate finish.

That the control of the machine is so concentrated and the convenience for operation so great that men like to operate a "LIBBY" Lathe and consequently push production with a minimum of fatigue.

Digitized by Google

INTERNATIONAL MACHINE TOOL CO., INDIANAPOLIS, IND.

CONDENSED DATA ON "LIBBY" LATHES

	16–18" "A" Lathe	24–26" "C" Lathe 4½" Hole	24–26" "C" Lathe 7½" Hole
Swing over ways	18½ in.	26½ in.	26½ in.
Swing over carriage	17¼ in	24 in.	24 in.
Travel of turret carriage	44 in.	72 in.	72 in.
Travel of tool post carriage	40 in.	72 in.	72 in.
Greatest boring depth capacity	13 in	23 in.	23 in.
Hole in spindle	3 1/16 in.	4½ in.	7½ in.
Three-jaw Universal chuck	16 in.	22 in.	22 in.
Front bronze bearing	4⅞ in. x 7 1/16 in.	6½ in. x 8 1/16 in.	9½ in. x 8 1/16 in.
Rear bronze bearings	4½ in. x 5¾ in.	5¾ in. x 5½ in.	8¾ in. x 5½ in.
Drive pulley—diameter	18 in.	18 in.	18 in.
Countershaft speed	480	500	360
Widt of belt	4 in.	8 in.	8 in.
Horse power of motor	10	20	20
Speed of motor (constant)	1200	1200	1200
Speed of motor (variable)	750 to 1600	750 to 1600	750 to 1600
Size of motor pulley at 1200 R. P. M.	4½ in. x 7¼ in. diam.	8½ in. x 7½ in. diam.	8½ in. x 5½ in. diam.
Width of front way	5⅞ in.	6 in.	6 in.
Width of back way	3½ in.	4½ in.	4½ in.
Turret slide bearing on ways	276 sq. in.	316 sq. in.	316 sq. in.
Tool post slide bearing on ways	141 sq. in	144 sq. in.	144 sq. in.
Diameter turret base	12⅞ in.	16 in.	16 in.
Diameter of turret across flats	14 in.	18 in.	18 in.
Hole in turret bushed to	3¼ in.	4¼ in.	4¼ in
Center of turret holes over ways	9 in.	12⅝ in.	12⅝ in.
Number of turret feeds	10	10	10
Range turret feeds	1/256 in. to ¼ in.	1/256 in. to ¼ in.	1/256 in. to ¼ in.
Diameter of tool post	7 in. sq.	9 in. sq	9 in. sq.
Tool post feeds	6	6	6
Range of feeds	1/128 in. to ¼ in.	1/128 in. to ¼ in.	1/128 in. to ¼ in.
Power cross feeds	6	6	6
Range of cross feeds	1/128 in. to ¼ in.	1/128 in. to ¼ in.	1/128 in. to ¼ in.
Screw cutting change gears	7	7	7
Threads per inch	2 to 32	2 to 32	2 to 32
Number spindle speeds	8	8	8
Range spindle speeds	8 to 300	8 to 238	8 to 142
Gear ratios	1.87 to 1	2.1 to 1	2.53 to 1
	2.75 to 1	3.3 to 1	3.5 to 1
	5 to 1	5.6 to 1	6.7 to 1
	8 to 1	8.8 to 1	9.3 to 1
	13 to 1	14.9 to 1	12.2 to 1
	20 to 1	23.5 to 1	16.9 to 1
	38 to 1	40.1 to 1	32 to 1
	60 to 1	62.5 to 1	45 to 1
Floor space	60 in. x 138 in.	71 in. x 170 in.	71 in. x 170 in.
Radial sweep of bar	33 in.	57 in.	57 in.
Rapid traverse per minute	40 ft.	35 ft.	35 ft.
Net weight	7600	12000	13500
Shipping weight	8000	12600	14000
Shipping weight—export	9200	14000	15000
Space occupied—export	250 cu. ft.	390 cu. ft.	390 cu. ft.

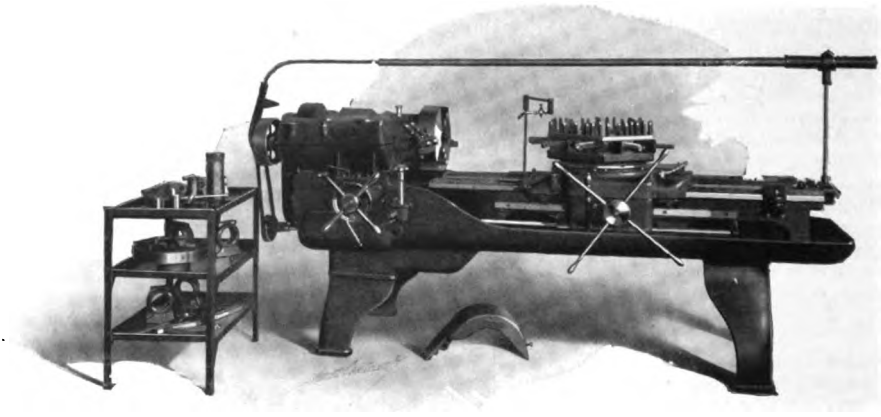
Digitized by Google

JONES & LAMSON MACHINE CO.

SPRINGFIELD, VERMONT, U. S. A.

503 MARKET STREET, SAN FRANCISCO, CAL.
9–10 WATER LANE, QUEEN VICTORIA STREET, LONDON, E. C.
France, Spain and Belgium: F. Auberty & Co., 182 Rue Lafayette, Paris
Holland: Spliethoff, Beeuwkes & Co., Rotterdam
Japan, Korea, Etc.: Mitsui & Co., Ltd., Tokio
Australia and New Zealand, McPherson's Pty., Ltd., 554 Collins St., Melbourne
Sweden: A. Bol. Oscar, Lindbom, Stockholm

Manufacturers of Hartness Flat Turret Lathe, Automatic Chucking Lathe, Automatic Die, Screw Thread Comparator and Fay Automatic Lathe



HARTNESS FLAT TURRET LATHES:

The Hartness Flat Turret lathe with cross-sliding head is made in two sizes, and may be furnished with an equipment of tools for either bar work or chuck work, or a double equipment for both bar and chuck work.

The smaller machine is called the 2¼ x 24-in. and when equipped with the automatic die outfit of tools it turns nearly every conceivable shape from the bar, up to 2¼ inches diameter and 24 inches of length. On chuck work its capacity is 12½ inches diameter or less.

The 3 x 36-inch size handles bars of stock up to 3 inches in diameter, turning pieces up to 36 inches in length. It may also be equipped for chuck work up to 14½ inches in diameter.

SPECIAL FEATURES:

The Original Flat Turret:

The Flat Turret was put on the market in 1891. Over fourteen thousand (14,000) machines equipped with them have been built and sold since, to the great satisfaction of the users. A large. steady tool clamping surface, a circular gib holding the turret down clear around its periphery, a locking pin directly under the cutting point of the tool—all these features combined to set a new standard of output, accuracy and range of work in turret lathe practice.

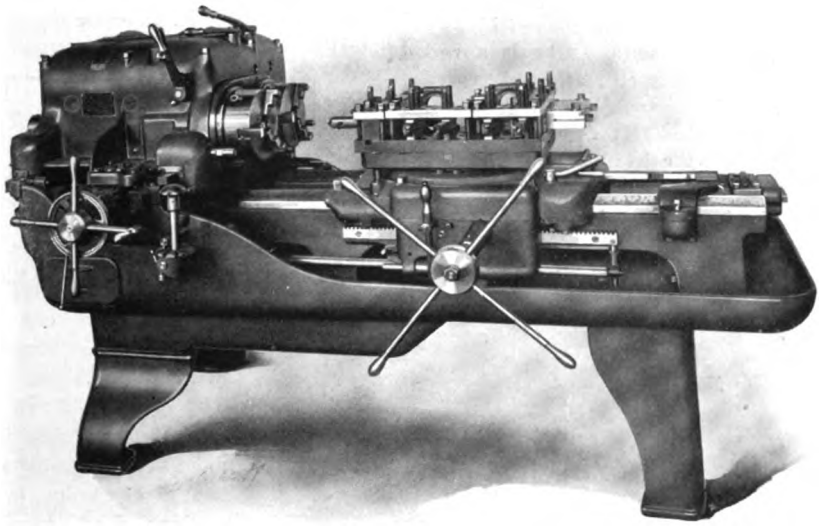
The unique set of tools employed covered at one leap the evolution from the old-fashioned "screw machine" to the modern turret lathe. It enabled the turret lathe to practically displace the engine lathe on bar and stud work.

The Cross-Sliding Head:

This feature, introduced in 1903, still further extended the field of the turret lathe, making it the standard machine for most chuck work of moderate size. The Cross-Sliding Head has three advantages: (1) It offers a cross-sliding motion gibbed directly and securely to the bed. There is no piling of slide on slide, no narrow bearing foundation for a lofty superstructure of slide, tool holder and tool. The design is so stable that the piloted type of holder is seldom needed. (2) It permits the cross feed to be applied to every tool on the turret if necessary. (3) By allowing a cross adjustment to every tool, complicated and costly special tools are minimized. The regular outfit covers all regular work.

Digitized by Google

JONES & LAMSON MACHINE CO. SPRINGFIELD, VT.



THE DOUBLE-SPINDLE HARTNESS FLAT TURRET LATHE:

The special field of usefulness of the "Double-Spindle" Hartness Flat Turret Lathe is in machining moderate sized castings, forgings, and certain limited classes of bar work in large lots for quantity of production. In addition it may be used as a single spindle machine of larger capacity, in which case it is adapted to small lot manufacture.

The machine has all the good qualities of the Single-Spindle Hartness Flat Turret Lathe which we introduced nearly a quarter century ago. With the expiration of the original patents, the flat turret has been adopted by other makers as the standard design for manufacturing work. But our later developments, like the cross-sliding head and the essential features of the double spindle, are of great mechanical and economic value to the manufacturer and are found exclusively in these machines.

The double-spindle feature nearly doubles the output per operator and per machine.

Two spindles, two sets of tools, two pieces of work.

One turret, one machine, one operator, one set of motions.

SPECIFICATIONS:

Working Range: Swing over ways is 17 inches when used as a single spindle machine, 10½ inches when both spindles are used. Cross travel of head is 10½ inches. Hole through spindle is 3⅛ inches.

The Cross Sliding Head: This is the only turret lathe in which the work-carrying headstock has a cross travel. This is indispensable on chuck work and is frequently convenient on bar work. It gives a cross feed for every tool without resorting to the frail double slide under the turret. Nine speeds in both directions from 19 to 301 revolutions per minute instantly obtainable. All gears run in oil bath.

The Turret: This is the original flat turret, 22 inches square, and is gibbed near outer edge. Index pin is located directly under working tool. On single-spindle work the corners of the turret can be used, giving eight positions in all.

The Power Feed: Both the carriage and the cross-sliding headstock are provided with power feed. It operates in both directions; has nine changes from 20 to 113 revolutions per inch of travel. These changes are instantly obtainable by sliding gears.

Stops: Each of the eight positions of turret is equipped with a separate stop, and there are four extra stops, making twelve in all. If desired, six stops can be used for one tool. The cross travel of the head is controlled by nine stops. Both sets of stops act in both directions and are placed as near as possible to the direct line of stress.

Floor Space for Machine is 5 x 10 feet. Approximate weight: net, 6600 pounds; crated, 6700 pounds; boxed for export, 7800 pounds. Cubic measurement, 240 cubic feet.

(Continued on next pages)

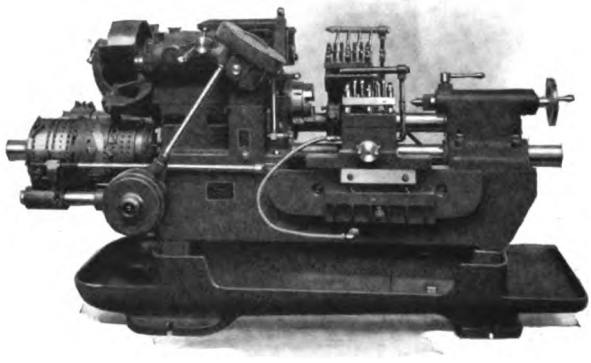
Digitized by Google

(Continued from preceding pages)

JONES & LAMSON MACHINE CO. SPRINGFIELD, VT.

THE FAY AUTOMATIC LATHE:

The Fay Automatic Lathe is a real lathe, with nine speed, all steel geared headstock, back tool holder, tailstock, carriage and bed. It differs from the engine lathe in the details of its mechanism which fit it especially for the particular work it is designed to do. There is also the added mechanism required to make it automatic in all its motions.



Field:

The Fay Lathe is designed for the automatic turning of work held on centers. It is thus adapted to work which is itself centered, or to work which is mounted on an arbor.

In the class of *centered work* are included such standard parts as steering knuckles for automobiles, driving gears for transmission, forgings in general of such shape as to be turned rather than chucked, and many miscellaneous castings of the same type.

In the class of *work done on arbors* is included the large variety of parts which in ordinary practice is turned in the engine lathe by this means, as pulleys (either straight-faced or crowned), gear blanks, flanges, disks, hubs, and a thousand and one other pieces of the kind used in textile machinery, automobiles, machine tools, electrical work and machine building in general.

Second operation work is the legitimate field of the Fay Lathe.

Furthermore, it has a large field of usefulness in the accurate finishing of parts roughed out on other and less accurate automatic machines.

On the work described above the Fay Lathe will do straight turning, taper turning, form turning, straight facing, bevel facing, recessing, singly or in combination, with roughing or finishing cuts. It will do everything of this sort except threading, for which it is not adapted.



Profitable Work for the Automatic Lathe

Advantages of the Fay Automatic:

1. Ease of setting.
2. Rapidity of changing work.
3. Two or more pieces at a time on some parts.
4. Multiple tooling.
5. Taper turning and bevel facing.
6. Form turning.
7. Turned surfaces free from scoring on the return movement.
8. Flexibility of mechanism.
9. Facing and turning simultaneously.
10. One operator runs two machines.

Digitized by Google

JONES & LAMSON MACHINE CO. SPRINGFIELD, VT.



THE HARTNESS SCREW THREAD COMPARATOR:

A machine that has been developed out of the experience of years spent in the study of Screw Threads; a machine that makes it possible, through a unique use of the projection lantern, to gage a screw accurately at a speed hitherto unattainable; a means of measuring the essential elements of a screw in the course of manufacture and for rapidly inspecting screws on the "dependability basis;" that is what we offer in the Hartness Screw Thread Comparator.

It will measure simultaneously errors in lead pitch diameter and shape of thread and add these errors together to indicate their combined effect on a fit in tapped hole of any desired depth. It will do all this more quickly than any single element can be gaged by the older methods.

DIE DIVISION MANUFACTURING HARTNESS AUTOMATIC DIES:

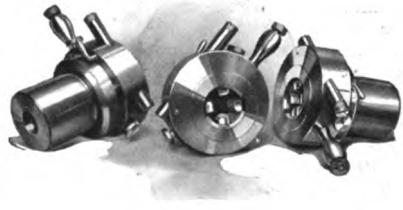
Wide Range **Few Dies**
High Accuracy **Small Expense**

No. 1 Die: Range for standard threads, from $\frac{3}{32}$ inch to $\frac{9}{16}$ inch diameter, any length. Particularly adapted for small hand or automatic screw machine work.

No. 4 Die: Range, $\frac{1}{4}$ inch to $1\frac{1}{4}$ inches diameter. This die is suitable for general turret lathe and screw machine use. It is especially adapted for use in automatic screw machines, owing to the compactness of its design.

No. 6 Die: Range, $\frac{3}{4}$ inch to 2 inches diameter. This die is adapted for medium to large work on screw machines, and turret lathes, and for the larger sizes of automatic screw machines.

No. 9 Die: Range, $1\frac{3}{4}$ inches to 3 inches diameter. This die is designed for the heaviest turret lathe work. It is provided with six chasers, and has a special double roughing attachment which adapts it particularly to large diameters or coarse pitches.



Any of these dies, even the large No. 9, will thread pitches as fine as 32 per inch on its largest diameter without danger of stripping.

The lead-controlling feature is exclusive with this die. You can cut long threads as accurate in pitch as you will get from the ordinary engine lathe.

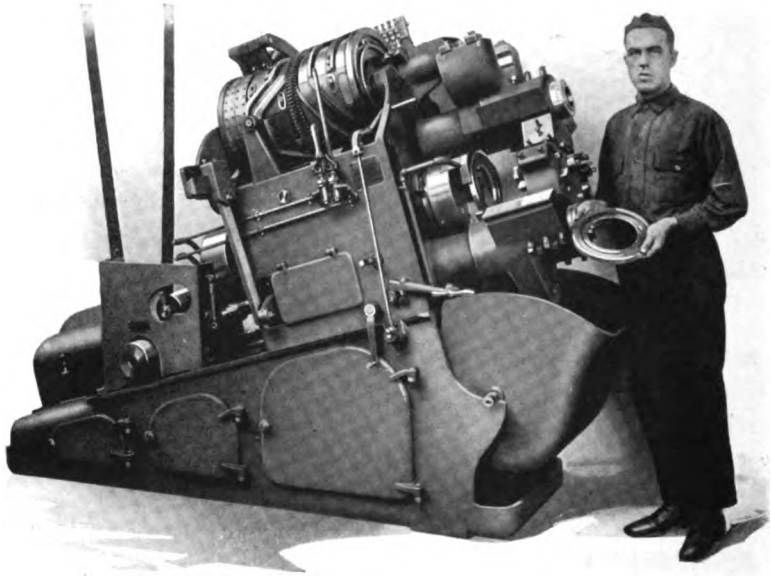
SEE OUR ADVTS IN MECHANICAL ENGINEERING THE JOURNAL OF THE A.S.M.E.

(Continued on next page)

Digitized by Google

(Continued from preceding pages)

JONES & LAMSON MACHINE CO. SPRINGFIELD, VT.



12 x 6 HARTNESS AUTOMATIC CHUCKING LATHE:

Range of Work. This machine is designed for the accurate and rapid production of lathe work in large quantities. Its maximum range is for work 12″ in diameter and 6″ in length. Movements are entirely automatic; it being only necessary for the operator to chuck and remove the work and to start the lathe after the new piece is chucked.

Speed Range. The regular equipment provides eleven changes of speed from 25 to 135 R.P.M. Two speeds are automatically obtained; one for roughing cuts and a faster one for finishing cuts.

Feed Movements. The feeds for cutting tools are controlled by cams mounted on a large cam drum. This drum is driven by change gears for the feeding movements, and is also driven at high speed for idle movements.

Gear Box. All clutches, gears, and change gears are placed in a separate box at the rear of the machine, and are instantly accessible by lifting the cover of the gear box. All gears are of hardened steel.

Tool Carriages. These are of the stiffest possible construction, and are mounted on large cylindrical bars, which slide in bushings at each end of the frame. The front bearings of the bars are supported in large bosses cast solid with the frame, and the bearings are directly in line with the cutting strains, thus eliminating all overhang.

The Upper Tool Carriage carries the cutters for the boring and turning cuts. It has an axial motion of seven inches and can also be oscillated a small amount so as to present first the roughing cutters and then the finishing cutters.

The Lower Tool Carriage carries the cutters for all facing operations. It has an axial movement of seven inches and will face any distance up to $3\frac{5}{16}$ when the cutter is on center.

Work Spindle. This is $4\frac{1}{2}$ inches in diameter with $3\frac{5}{8}$ inch hole. The face plate is forged integral with the spindle.

Motor Drive. The machine can be fitted for motor drive after shipment at a slight additional expense. When equipped for Motor the Driving Pulley is 18″ diameter for a 4″ belt and runs at 660 R.P.M.

The Countershaft pulley receiving the belt from the main line is 12″ diameter for a 5″ belt and runs at 515 R.P.M.

Floor Space required is 6 feet x 9 feet. Approximate weight, net 7200 lbs.; crated 8000 pounds.

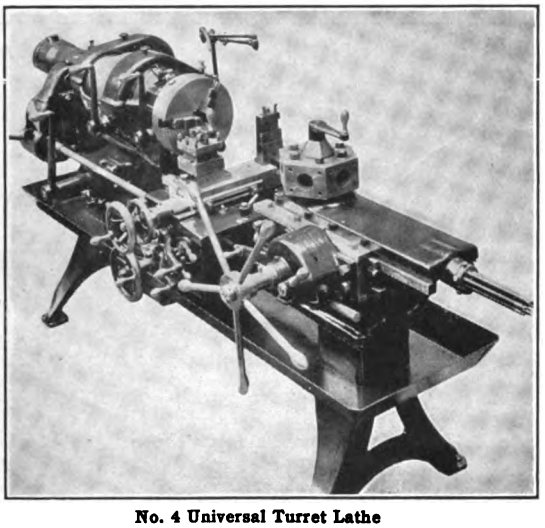
SEE OUR ADVT. IN MECHANICAL ENGINEERING

Digitized by Google

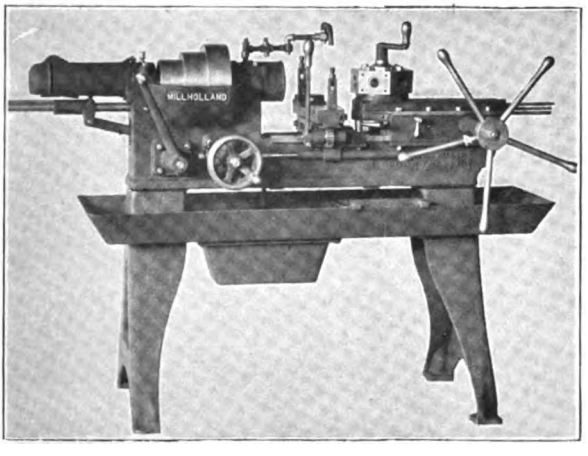
MILLHOLLAND MACHINE CO.

INDIANAPOLIS, INDIANA

Builders of "Millholland" Screw Machines and Turret Lathes



No. 4 Universal Turret Lathe



No. 2 Screw Machine, 1 x 7 Capacity

TURRET SCREW MACHINES:

Sizes 1 x 7, 1⅝ x 10, and 2¼ x 10 capacity.

MILLHOLLAND MANUFACTURING TURRET LATHES:

Sizes 2½ x 14, and 3½ x 36. Chucking capacity 18". Designed for broad facing cuts, all tools fed by screw. Bar and chucking equipments are readily interchangeable.

Catalog fully describing machines sent upon request.

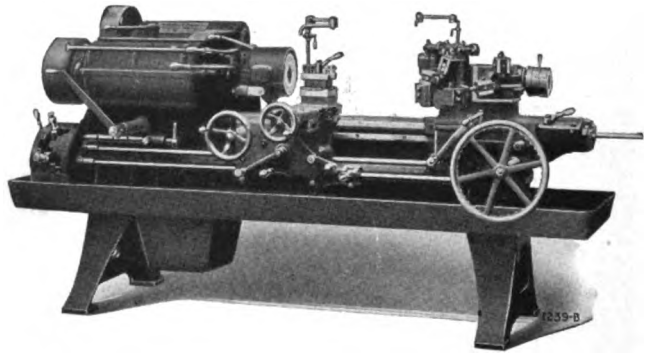
Digitized by Google

THE WARNER & SWASEY CO.

CLEVELAND, OHIO

NEW YORK BOSTON BUFFALO DETROIT CHICAGO

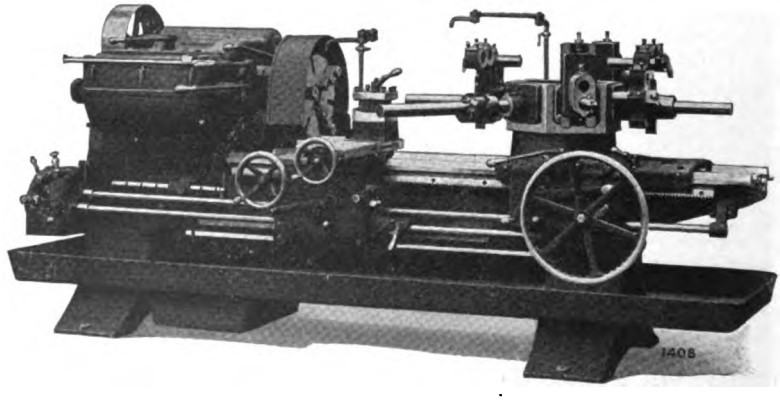
Manufacturers of Turret Machinery



NO. 2-A Universal Hollow-Hexagon Turret Lathe: Bar Equipment
Two Capacities—2½″x29″; 16½″ swing—3¼″x29″; 16½″ swing

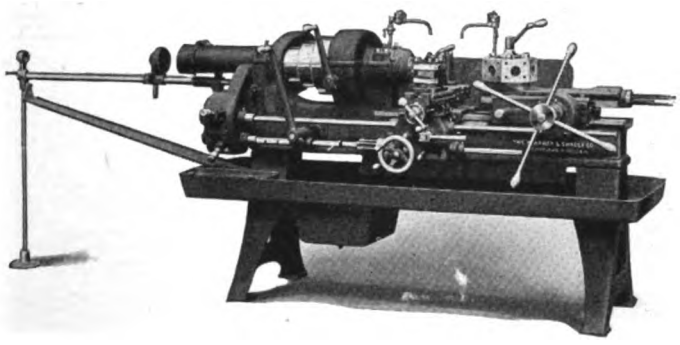
456 **UNIVERSAL HOLLOW-HEXAGON TURRET LATHES:**

Rapid and accurate production were the considerations in developing the Universal Hollow-Hexagon Turret Lathe. As many as ten tools may be used on one set-up, the hexagon turret carrying six and the square four. The two turrets work simultaneously on a number of jobs, often reducing the cutting time in half. These machines have more than enough power to push to the limit the best high speed steel cutters known to present industry. The design of the head and turrets, and their general construction have gained for them the enviable reputation of delivering the greatest accurate production physically possible for a turret lathe.



No. 3-A Universal Hollow-Hexagon Turret Lathe: Chucking Equipment
Two Capacities—3½″x44″; 21½″ swing—4½″x44″; 21½″ swing

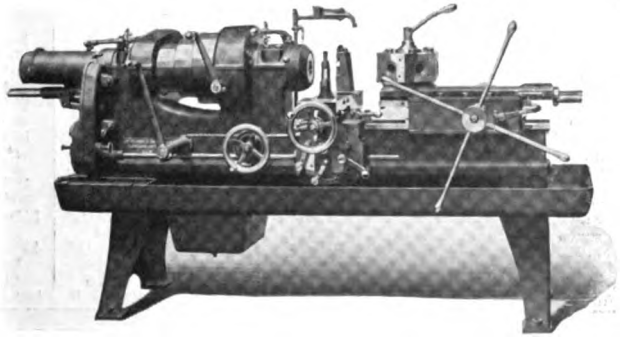
Digitized by Google



No. 4 Universal Turret Lathe: Bar Equipment
Capacity: 1½″x10″; 16″ swing

THE NO. 4 UNIVERSAL TURRET LATHE is extensively used for bar and chucking work slightly smaller than that which can be handled economically on the universal hollow-hexagon turret lathes. With its power-driven turret and carriage and its wide range of speeds and feeds it is distinctly a universal machine.

THE NO. 6 TURRET LATHE is equipped with double friction back gears, and with or without automatic chuck, bar feed, and power feed to turret. Either the standard or heavy duty carriage is furnished with the machine. With the heavy duty carriage on the No. 6, gear blanks, forgings, and tough alloy steels requiring heavy forming and facing cuts are handled to great advantage. Then, too, it is as easy to operate on the ordinary jobs as a machine without its reserve strength.



SEE OUR ARTICLE IN MECHANICAL ENGINEERING

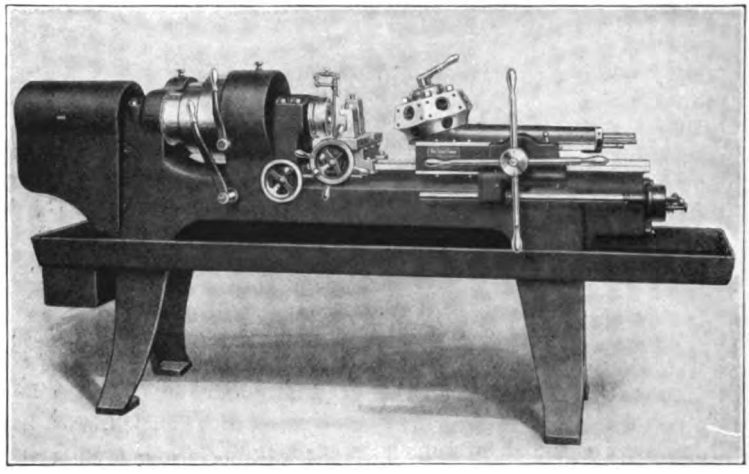
No. 6 Turret Lathe: Double Friction Back Gears
Capacity: 2¼″x12″; 20⅜″ swing
Other Turret Lathes from ⅝″ capacity

Digitized by Google

WOOD TURRET MACHINE CO.

BRAZIL, INDIANA, U. S. A.

Manufacturers of the Tilted Turret Lathes and Screw Machines



THE TILTED TURRET Lathes and Screw Machines constitute a line of strictly high grade machine tools which are the result of broad experience, unexcelled facilities, together with a personnel of specialized mechanics.

Workmanship throughout is of the highest class. They are easy to operate, rigid in construction and will hold their accuracy indefinitely. Wearing parts are so constructed that they can be adjusted without changing the alignment of turret or spindle.

We specialize exclusively in manufacturing THE TILTED TURRET LATHES and screw machines, and tools for manufacturing from a pin to a locomotive. Since the introduction of THE TILTED TURRET, it has had a steady increase in sales of duplicate orders. FIFTEEN YEARS OF SATISFIED USERS. ASK THE USER.

THE TILTED TURRET, SEMI-AUTOMATIC, FRICTION-GEARED HEAD

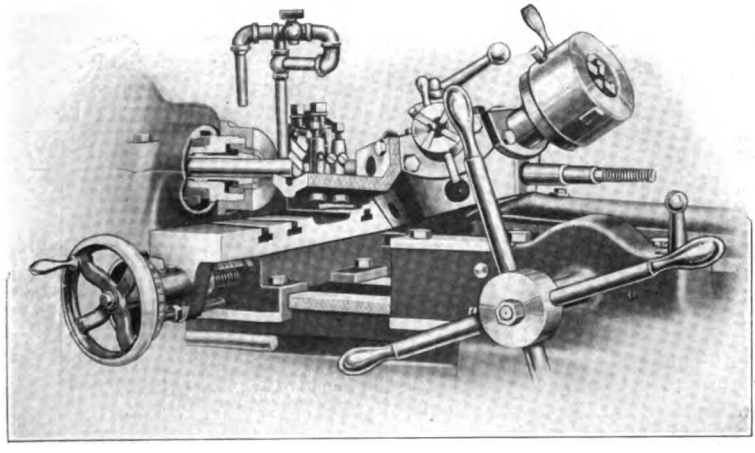
Number of Machine	No. 2	No. 3	No. 4	No. 5	No. 6
Automatic chuck capacity	1″	1 1/4″	1 1/2″	1 3/4″	2″
Without power feed to turret slide	Prune	Plum	Robin	Thrush	Dove
With power feed to turret slide	Quince	Peach	Sparrow	Eagle	Lark
Dia. hole in spindle (auto. chuck removed)	1 5/16″	1 9/16″	1 7/8″	2 1/8″	2 1/2″
Dia. hole in auto chuck plunger	1 1/16″	1 5/16″	1 9/16″	1 13/16″	2 1/8″
Diameter thread on spindle	3 7/8″	3 7/8″	3 7/8″	5 1/4″	5 1/4″
Pitch of thread on spindle	8 P	8 P	8 P	6 P	6 P
Swing over bed	13″	13″	13 1/4″	15″	15″
Largest diameter cone	12″	12″	12″	14″	14″
Width of belt	3″	3″	3″	3 1/2″	3 1/2″
Diameter of turret (across the flat)	6 1/4″	7 1/4″	7 3/4″	10 1/8″	10 1/8″
Diameter of holes in turret	1″	1 1/4″	1 1/2″	1 3/4″	2″
Holes in turret to top of slide	3 1/2″	3 1/2″	4″	4″	4 1/4″
Effective motion to slide	10″	10″	10″	12″	12″
Max. dist. end of spindle to face of turret	16″	18″	18″	30″	30″
Friction pulley on countershaft	10″x3 3/4″	10″x4 1/4″	12″x4 1/4″	14″x4 7/8″	14″x4 3/8″
Countershaft speed	325	300	250	225	200
Floor space	36″x96″	36″x102″	40″x108″	44″x128″	44″x132″
Wt., crated, for dom. shipment, about	2170	2440	2540	3830	4030
Wt., boxed for for'n shipment, about	2545	2815	2915	4495	4725
Bulk, boxed for for'n shipment, about	102 cu. ft.	102 cu. ft.	102 cu. ft.	190 cu. ft.	190 cu. ft.
With Automatic Chuck but without Bar Feed					
Without power feed to turret slide	Raisin	Willow	Swallow	Oriole	Gull
With power feed to turret slide	Elm	Oak	Owl	Quail	Raven
Without Automatic Chuck and Bar Feed					
Without power feed to turret slide	Poplar	Maple	Crow	Canary	Magpie
With power feed to turret slide	Pine	Walnut	Hawk	Wren	Buzzard

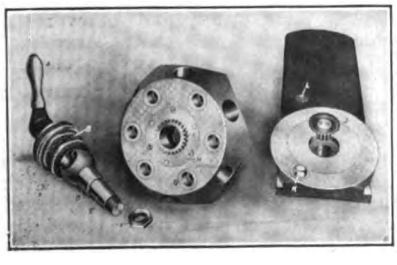
Digitized by Google

WOOD TURRET MACHINE CO. BRAZIL, IND.

THE TILTED TURRET, SEMI-AUTOMATIC WITH PLAIN HEAD

Number of Machine	No. 1	No. 2	No. 3
Automatic chuck capacity	3/4"	1"	1 1/4"
Diameter hole in spindle (auto. chuck removed)	1 1/16"	1 1/16"	1 5/16"
Diameter hole in auto. chuck plunger	13/16"	1 1/16"	1 5/16"
Diameter thread on spindle	3"	3 7/8"	3 7/8"
Pitch of thread on spindle	8 P	8 P	8 P
Swing over bed	11"	13"	13"
Large diameter cone	9"	11"	12"
Width of belt	2 1/2"	3"	3 1/2"
Diameter of turret (across the flat)	5 1/2"	7 1/4"	7 3/4"
Diameter of holes in turret	7/8"	1"	1 1/4"
Center of holes in turret to top of slide	2 5/8"	3 1/2"	3 1/2"
Effective motion to slide	6"	10"	10"
Max. dist. end of spindle to face of turret (hand feed machine)	12"	16"	16"
Friction pulleys on countershaft	10"x3 1/4"	10"x3 3/4"	12"x4 1/4"
Countershaft speed	250	225	200
Floor space	67 1/2"x27"	73"x28"	76"x28"
Weight, crated, domestic shipment, about	1275 lb.	2034 lb.	2204 lb
Weight, boxed, foreign shipment, about	1700 lb.	2358 lb.	2528 lb.
Bulk, boxed, about	69 cu. ft.	86 cu. ft.	86 cu. ft.
Code word	Apple		
Without power feed to turret slide		Banana	Barberry
With power feed to turret slide		Baneberry	Bayberry
With auto. chuck, without bar feed	Apricot		
Without power feed to turret slide		Bilberry	Bean
With power feed to turret slide		Cucumber	Beet
Without auto. chuck and bar feed	Blueberry		
Without power feed to turret slide		Cherry	Chickpea
With power feed to turret slide		Chesty	Citron





Can a turret lathe or screw machine be designed and manufactured so as to be a precision machine and retain this accuracy under the present-day demand for maximum production?

Send for The Tilted Turret Lathe and Screw Machine Encyclopedia, and decide for yourself.

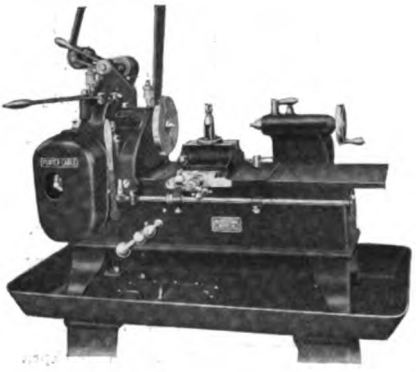
Digitized by Google

THE PORTER-CABLE MACHINE COMPANY

SYRACUSE, N. Y.

Manufacturer of Production Lathes and Tool Room Lathes

PORTER-CABLE PRODUCTION LATHE:



Porter-Cable Lathes mean production in terms of seconds. Not alone does this speedy machine turn the work out quickly but the powerful and rigid construction means clean, accurate work. They are especially adapted for machining Drills, Reamers, Studs, Bolts, Gear Blanks, Pistons, Piston Rings, all kinds of Bushings and similar parts now tying up full size engine lathes. You can place two P-C lathes approximately where there is now one full length bed engine lathe and the same man can tend these two or more depending on the time for the cut.

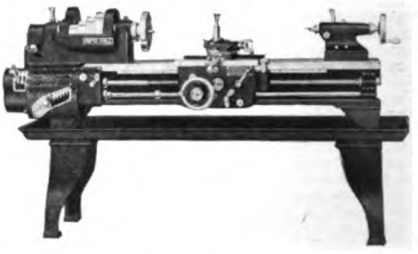
Full line of attachments can be furnished including threading, taper, facing, quick return to carriage, lever or wheel operated chuck closer, lever tail spindle, turret tool post, etc.

Made in two sizes:

9″ swing x 14″ or 20″ between centers
Hole in spindle takes 1″ dia. bar
Belt 3″, single ply
Possible spindle speeds obtainable 75 to 2000 R. P. M.
Floor space 42½″ x 21½″
Shipping weight 9 x 14—1100 lbs.
Shipping weight 9 x 20—1200 lbs.

Send us one of your typical production problems and we will offer you some interesting figures.

PORTER-CABLE TOOL ROOM LATHE:



Since accuracy is the essential quality sought in tool room lathes, Porter-Cable lathes for tool room service are designed and constructed to fulfill that requirement to the limit of a workable, commercial machine tool. The materials are the best suited for the purpose; parts are generous in size but not cumbersome and the workmanship is that of master tool builders, thoroughly tested and inspected. Every lathe is guaranteed to bore or turn true within .001″ per foot, if properly set up and leveled.

SPECIFICATIONS—REGULAR EQUIPMENT

	12 Inch Lathe	14 Inch Lathe
Swing over bed	12¾″	14¼″
Swing over carriage	7½″	8½″
Standard length of bed	4–5–6 ft.	5–6 ft.–8 ft.
Cone diameters	2⅞″, 4½″, 6⅛″, 7¾″	3⅝″, 5¼″, 6⅛″, 8½″
Width of belt	1¾″	2″
Hole through spindle	1⅛″	1″
Cut screws	1½ to 100	1½ to 100
Feeds	6–400	6–400
6-foot lathe takes in between centers	40″	36″
Capacity of center rest	4″	4″
Cross-feed and compound screw graduated to thousandths		
Net weight, 5-foot bed	1990 lbs.	2100 lbs.
Weight skidded and crated, 5-foot bed	2085 lbs.	2200 lbs.

Regular Equipment, upon which base price is determined, includes compound and plain rests, steady and follow rests, double friction countershaft, large and small face plates and necessary wrenches.

Send for additional literature about this lathe.

When you purchase this lathe you buy more than the mere lathe—you get the Porter-Cable Machine Company in back of it to see that, within all reasonable expectations, it performs its service satisfactorily.

Digitized by Google

THE VELCO MANUFACTURING CO., INC.

GREENFIELD, MASS.

Manufacturers of Broaches and Broaching Machinery

BROACHING MACHINES:

No. 2 Broaching Machine for the lighter grades of broaching. A complete broaching machine at a very low price.



Velco No. 4
Heavy Duty Broaching Machine

No. 4 Production Type. A most highly developed broaching machine. Worm driven, all gears run in oil, driving shaft has ball bearings. All other bearings ring oiled, all gears run in oil. The clutch is never operated under load. The machine is suited for all types of broaching. Cutting speed 15 ft. per minute, return speed 55 ft. per minute.

HAND OPERATED BROACHING PRESSES:

Made in two sizes suitable for broaching and light assembling. Light in weight, great leverage, reasonable prices.

STANDARD KEYWAY CUTTER FOR ALL MAKES OF BROACHING MACHINES.

Featuring the Velco Patented Staggered Tooth practically eliminating breakage due to lack of chip clearance.

ROUND BROACHES:

Designed to overcome the tendency to "crawl." Producing very accurate holes and a fine finish.

MULTIPLE SPLINE BROACHES:

Any type and size, accurately made from the finest steel obtainable for the purpose.

SQUARE, HEXAGON AND SPECIAL SHAPES:

Designed and made to meet any requirement. Accuracy and results guaranteed.

KEYWAY CUTTERS FOR USE IN ARBOR PRESS: 461

We are original makers of the hand operated keyway set (pat. applied for), for the rapid cutting of keyways under a press. Made in two sizes for keyways up to $\frac{9}{16}$", special sizes to order.



Hand Operated Keyway Set

GAGES FOR BROACHED HOLES:

We are prepared to make gages for every kind of broached hole.

Literature on request.

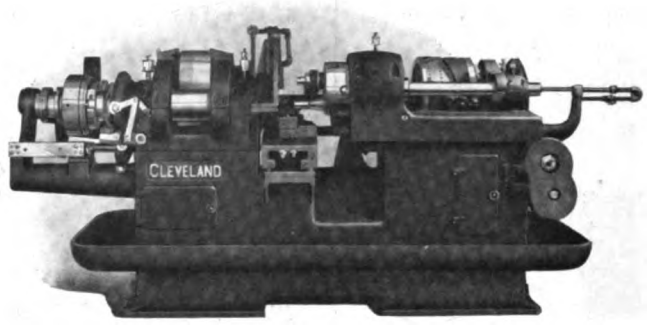
Estimates without Obligation

Digitized by Google

THE CLEVELAND AUTOMATIC MACHINE COMPANY

CLEVELAND, OHIO

Manufacturers of Automatic Screw and Forming Machines



OUR AUTOMATICS ARE EASY TO OPERATE—CONSEQUENTLY THEY ARE STEADY PRODUCERS:

The Cleveland Automatic Machine Co. has been in business since 1891.

We manufacture four designs of automatic screw and forming machines.

Our plain pattern machine is low in cost and exceptionally speedy in outputs and is intended for work not requiring many operations.

We build sizes from 3/8" which will handle 1/8" bar weighing one ounce, up to a bar 8" in diameter weighing 1600 pounds. Our smallest machine weighs 1300 pounds and our largest machine weighs 8 tons.

We can use as many as ten tools simultaneously on pieces up to 18" long.

There is scarcely any kind of apparatus manufactured containing metal, from dental tools to locomotives, where our machines are not used in producing some of the parts.

We use attachments of various kinds for magazining the work automatically, thereby doing away with second operation on pieces separated from the bar, also in the handling of castings of various shapes reducing the cost in some instances 200% over the methods where automatics were not used.

There are no other manufacturers in the world who build as many designs or as large automatics as we do.

Our variable speed motor driven automatics have no equal or anything approaching them.

Our machines are used from coast to coast in this country and all over Europe, and as far away as Australia and Japan.

A great portion of our work is figured from blue prints. We name the price of the machine and tools and the guaranteed outputs.

Digitized by Google

THE NEW BRITAIN MACHINE CO.

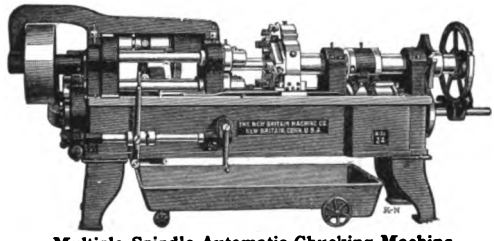
NEW BRITAIN, CONN.

Manufacturers of Automatic Screw and Chucking Machines

MULTIPLE-SPINDLE AUTOMATIC CHUCKING MACHINES:

Single- and Double-Head Types

Designed for finishing castings, forgings and second operations on screw-machine products. All operations performed simultaneously and automatically, the time required to complete a piece involving a series of operations being only that of the longest single operation or subdivision thereof. Productions three to five times those of the turret lathe or hand screw machine.

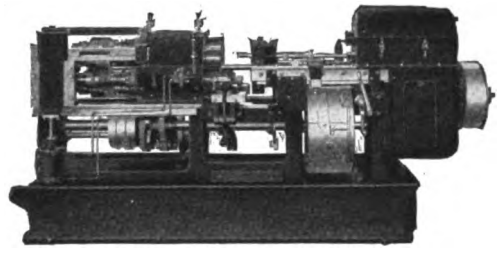


Multiple-Spindle Automatic Chucking Machine
Single-Head Type

MULTIPLE-SPINDLE AUTOMATIC CHUCKING MACHINE:

Work-Rotating Type

Adapted for handling certain classes of work formerly done on machine illustrated above—but with greater efficiency. Work is rotated, enabling use of both end and cross slide tools simultaneously. Air pressure is used to stop and start the spindle and to release and grip the work, thus relieving the operator from the labor of hand chucking-up and constant clutching of spindle.

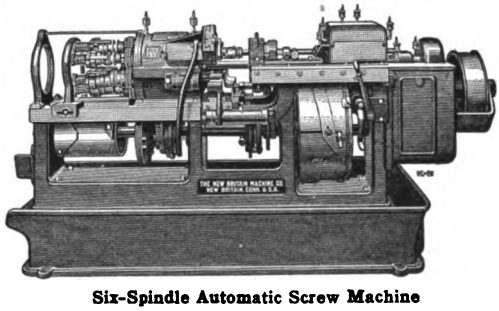


Multiple-Spindle Automatic Chucking Machine
Work-Rotating Type

SIX-SPINDLE AUTOMATIC SCREW MACHINE:

For producing parts from bar stock. Fully automatic. Its six spindles make rehandling of complicated work unnecessary and greatly increase production on simple work by the subdivision of the longer operations.

Sizes ⅝", 1", 1⅝" and 2½".

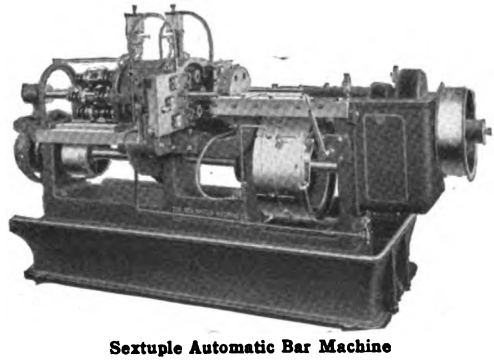


Six-Spindle Automatic Screw Machine

SEXTUPLE AUTOMATIC BAR MACHINE:

For blanking rolls, sleeves, pipe couplings, studs, nuts, etc., from bar stock. Six spindles. Fully automatic. Designed to feed, drill, face, turn, chamfer, and cut off in all six positions, making possible productions nearly six-fold those of a single-spindle automatic.

Production estimates gladly submitted.



Sextuple Automatic Bar Machine

Digitized by Google

THE NATIONAL ACME COMPANY

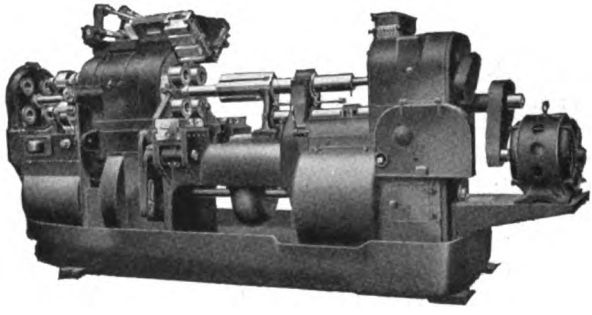
CLEVELAND, OHIO

NEW YORK BOSTON CHICAGO DETROIT BUFFALO

Screw Machinery, Screw Machine Products, Threading Dies and Taps

ACME MULTIPLE SPINDLE AUTOMATIC SCREW MACHINES:

For the automatic production of duplicate parts from metal bars, in sizes up to 4″ diameter, 12″ long.



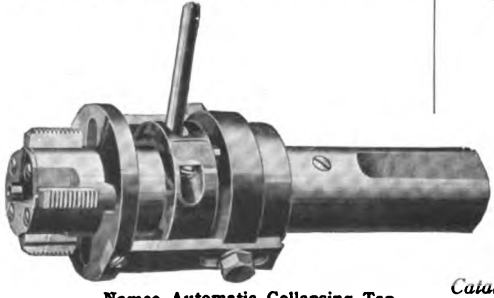
Acme Multiple Spindle Automatic Screw Machine

Secondary operations are reduced to a minimum by the use of tools for shaving, cross drilling, 'end and side milling, threading, etc., on machines capacity up to 2¼″.

Furnished with Single Belt or Motor Drive.

NAMCO AUTOMATIC COLLAPSING TAPS:

Have positive collapsing chasers fully supported back of the cutting edge; simplicity of construction and few adjustments; wide range of work as chaser diameter is largest diameter on tap. "No hole too deep." Inside and outside trip. Capacities up to 7⅛″.



Namco Automatic Collapsing Tap Outside Trip

NAMCO AUXILIARY SCREW MACHINES:

Of fully automatic and semi-automatic types are built as follows:

Stud Threaders Bolt Threaders

Single and Multiple Spindle Semi-Automatic Drilling Machines.

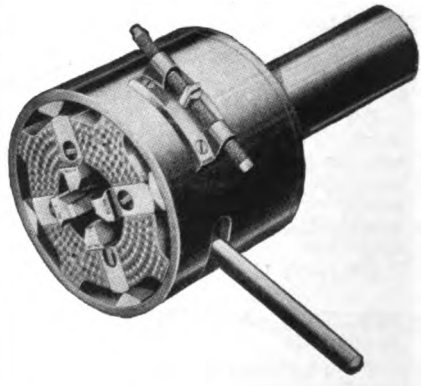
Screw Head Slotting Machines all are highly specialized for secondary operations.

Tool and Chaser Grinding Machines.

Bar-Pointing Machines

NAMCO AUTOMATIC THREADING DIES:

For every threading requirement include Self-Opening Dies for Hand Machines; Self-Opening and Self-Closing Die Heads for Automatic Screw Machines, Bolt Threader, etc.; Adjustable Spring Dies.



Namco Automatic Threading Dies are built in 3 styles. Capacities $\frac{3}{16}$″–4½″

Catalogs on any of the above sent on request. Quotations made on samples or blue prints.

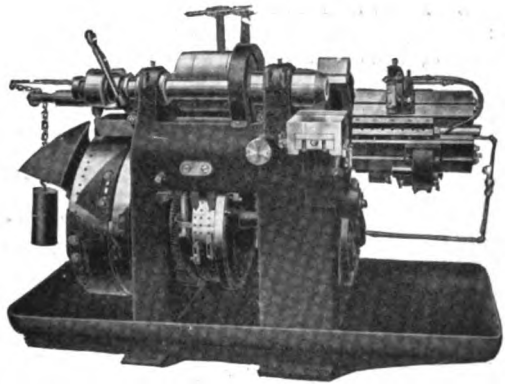
Digitized by Google

THE NATIONAL ACME COMPANY

(Successors to Windsor Machine Co.)

WINDSOR, VERMONT

NEW YORK BOSTON CHICAGO DETROIT BUFFALO



The Gridley Single Spindle Automatic

GRIDLEY SINGLE AND MULTIPLE SPINDLE AUTOMATIC SCREW MACHINES:

Gridley Single and Multiple Spindle Screw Machines are fully automatic and are designed for making duplicate metal parts from bar stock.

Extreme accuracy is obtained by the rigid frame design and method of holding tools close up to their cutting points.

The simplicity of setups permits an exceptionally wide range of tooling, while the possible tool combinations reduce secondary operations to a minimum.

The Gridley Single completes, automatically, work usually accomplished on turret lathes, in sizes up to 5″ diameter, while the Multiple Spindle finishes the small duplicate parts up to 2⅜″ diameter.

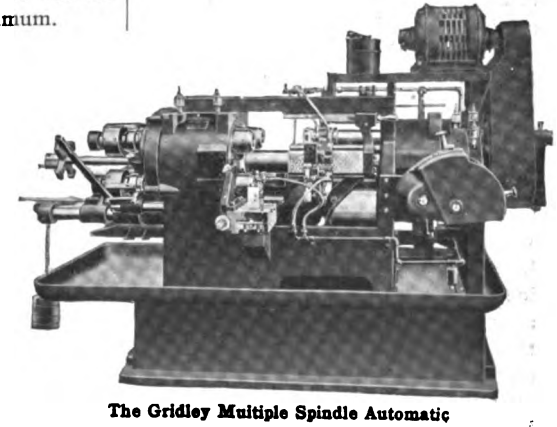
Both types are furnished with either Belt or Motor Drive.

THE GRIDLEY SINGLE SPINDLE AUTOMATIC is built in four sizes—2¼″—3¼″—4¼″—5″ and handles work up to 12″ in length.

THE GRIDLEY PISTON and RING MACHINE—capacity 6″ diam.

THE GRIDLEY MULTIPLE SPINDLE AUTOMATIC is built in five sizes—
$\frac{9}{16}$″—⅞″—1¼″—1¾″—2¼″ and handles work up to 7″ in length.

Complete descriptions on request.



The Gridley Multiple Spindle Automatic

Digitized by Google

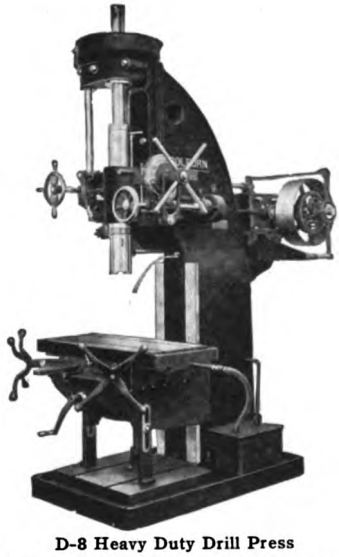
THE COLBURN MACHINE TOOL CO.

CLEVELAND, OHIO, U. S. A.

Heavy Duty Drill Presses—Vertical Boring and Turning Mills

COLBURN D-TYPE HEAVY DUTY DRILL PRESSES:

Designed primarily to meet the exacting demands of Heavy Duty Drilling, tapping, boring, reaming, facing, undercutting, counterboring, trepanning, and like operations.



D-8 Heavy Duty Drill Press

The D-8 here illustrated has a drilling capacity to the full cutting edge of a 5 inch high speed drill in solid steel. Gears are heat-treated and hardened, and run continuously in a bath of oil. Shaft journals in speed box are equipped with combined radial and thrust ball bearings. The spindle is forged high carbon steel of extra large dimensions, double splined, thus equalizing the excessive strain exerted on the sides of the keys when driving large drills and boring tools. The spindle thrust is taken by self-aligning ball bearings. All levers are located at front of machine within easy reach of the operator. Furnished with plain or compound table. Equipped with tapping attachment and tapping hood for extra heavy tapping if desired.

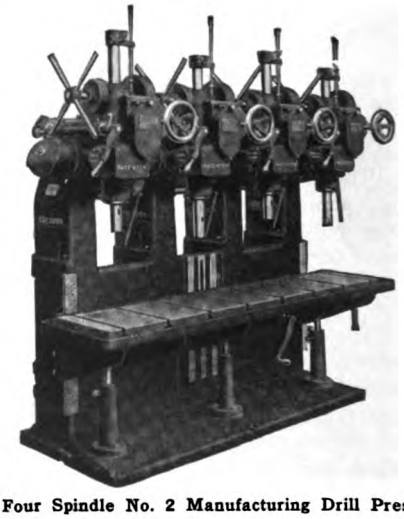
Built in three sizes:
D-4—24″ swing—3½″ drilling capacity.
D-6—36″ swing—3½″ drilling capacity.
D-8—36″ swing—5″ drilling capacity.

COLBURN MANUFACTURING TYPE HEAVY DUTY DRILL PRESS:

This manufacturing drill press, while originally designed as a single purpose machine for drilling large quantities of duplicate parts, has an ingenious patented device which gives practically an *unlimited range of speeds and feeds* thus greatly enlarging its field of usefulness.

Built with one, two, three, or four spindles to suit requirements.

If you have duplicate pieces to drill, ream, tap, counterbore, face, undercut, etc., this machine will greatly increase your production and reduce your manufacturing costs.



Four Spindle No. 2 Manufacturing Drill Press

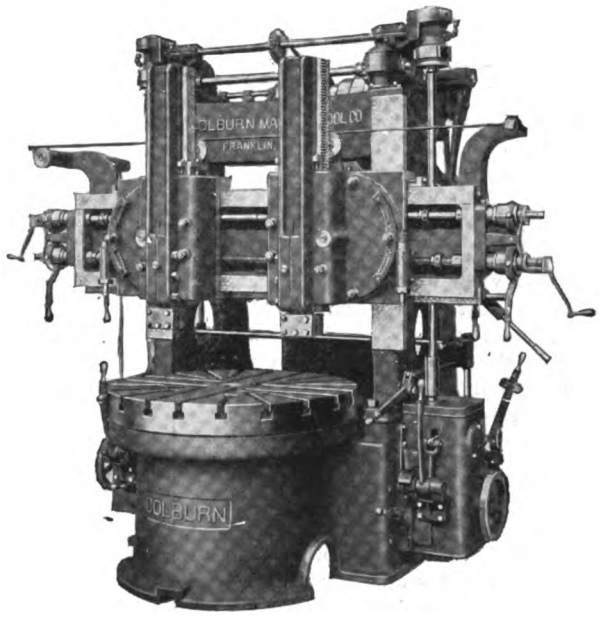
Bulletins illustrate and describe the various sizes we build.

Digitized by Google

THE COLBURN MACHINE TOOL CO. CLEVELAND, OHIO.

COLBURN VERTICAL BORING AND TURNING MILLS:

To obtain maximum production, likewise minimum shop cost, on a Vertical Boring and Turning Mill, it is essential that the machine be of staunch and sturdy build and have powerful drive and feed mechanism, massive cross rail, heads, table, etc. It must also at all times be under the quick and easy control of the operator.



Colburn 48" Boring and Turning Mill

The Colburn meets fully these essential requirements. Speed and feed changes are readily made. Controlling levers are located at the front of the machine and duplicated at either side.

The operator does not move from his regular working position in making changes.

Power rapid traverse is provided for the heads, always reversing the direction in which the tool may be feeding. This avoids any possibility of damaging the work.

A brake quickly stops the table at any predetermined point. Driving gears run in a bath of oil. There are many other interesting details.

Built in four sizes: 48, 54, 60 and 72 inch swing.

Let us send our complete catalog, or bulletins of any size you are interested in.

SPECIFICATIONS

Sizes	Swing	Max. Distance under Cross Rail	Table Diameter	Vertical Travel of Rams	Dia. Ram Tool Holder Shanks	Dia. Turret Tool Holder Shanks	Table Speeds R. P. M.	Speed of Counter Shaft
48"	49½"	34"	44"	30"	3"	2½"	3 to 54	500 R. P. M.
54"	55"	46"	53"	30"	3"	2½"	2½ to 45	500 R. P. M.
60"	62"	46"	60"	32"	3½"	2¾"	1.9 to 35	500 R. P. M.
72"	74"	46"	68"	32"	3½"	2¾"	1.9 to 35	500 R. P. M.

Digitized by Google

T. C. DILL MACHINE COMPANY, INC.

PHILADELPHIA, PA., U. S. A.

Builders of Slotters

THE "DILL SLOTTER:"

In the design of the "Dill Slotter," to meet the demands of today, it was plain that a departure was necessary and that procedure must be in at least two directions: First, that the machine must be able to produce a greater amount of work and that work must be more accurate. Second, that it must have a much greater range and not be confined only to the ordinary slotter work, but also reach out into other fields of usefulness; and besides all this, it must be, if possible, more durable. The following features, which for the most part are exclusive, show how this Slotter meets the above requirements.

The GENERAL CONSTRUCTION of the "Dill Slotter" throughout is such as to insure efficiency and durability. It is constructed of the best material for the purpose; the gears are all cut from solid metal and mostly of forged steel; flat bearing surfaces are all hand-scraped to surface plates and are of ample dimensions. Gears, shafts, etc., are readily accessible for inspection. The convenience of operation is of special merit; while it is operative from one point principally, hand feeds are provided on all sides.

Attributes:

A Traveling Head—Greatly increases the range of the machine.

A Quick Traverse Gear—A great time and labor saver.

New Quick Return—Permits high and uniform cutting speeds.

New Intermittent Feed—For feeding heavy work at high speeds.

An Automatic Knock-Off—A safety device for the feed mechanism.

A Stroke Indicator—Quite indispensable; nothing like it.

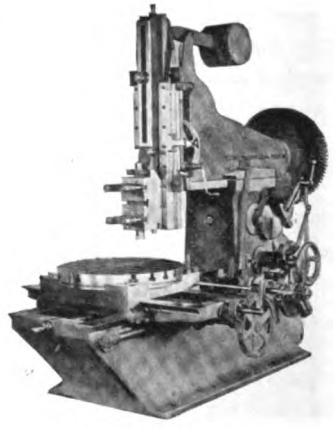
A Hand Wheel Controller—A good thing, and in the right place.

A Tool Post in the Relief Apron—Very handy in changing tools.

Six Changes of Speed—About four is the usual number.

Belt and Motor Driven—Designed for both; not a make-shift.

Powerfully Geared—About double the usual ratio.



PRINCIPAL DIMENSIONS

Size of machine, in	10	10–12	15	15–18	20	20–24
Maximum stroke, in	10½	12½	15½	18½	21	25
Longitudinal movement of table, in	28	28	36	36	48	48
Transverse movement of table, in	20	20	30	30	40	40
Diameter of table, in	24	24	34	34	44	44
Movement of head, in	15	15	20	20	30	30
From table to head, in	12	12	19¼	19¼	24½	24½
Adjustment of ram, in	16	16	23	23	32	32
Will cut to the center of circle of	54 in.	54 in.	72 in.	72 in.	92 in.	92 in.
Will cut to outside of circle of	54 in.	54 in.	90 in.	90 in.	108 in.	108 in.
Strokes of ram per minute, r. p. m	11½–85	10–76	8–48	7–43	6–31	5½–27
Feed of table per stroke, in	0.011 to 0.154	0.011 to 0.154	0.010 to 0.187	0.010 to 0.187	0.0069 to 0.138	0.0069 to 0.138
Circular feed per stroke at 12 in. dia. (in.)	0.0187 to 0.261	0.0187 to 0.261	0.011 to 0.196	0.011 to 0.196	0.0055 to 0.11	0.0055 to 0.11
Feed of head per stroke, in	0.0055 to 0.077	0.0055 to 0.077	0.005 to 0.093	0.005 to 0.093	0.00345 to 0.069	0.00345 to 0.069
Ratio of gears from cone pulley shaft	12 to 1	12 to 1	18 to 1	18 to 1	24 to 1	24 to 1
Size of countershaft pulley, in	14x3½	14 x 3½	20 x 4	20 x 4	26 x 5	26 x 5
Speed of countershaft, r. p. m	200	180	200	180	200	180
Horsepower of motor	3	3	5	5	10	10
Speed of constant speed motor, r. p. m	1,200	1,000	1,200	1,000	1,200	1,000
Speed of adjustable speed motor, r. p. m	400 to 1,200	400 to 1,200	400 to 1,200	400 to 1,200	400 to 1,200	400 to 1,200
Net weight, lbs	5,750	6,000	11,000	11,500	25,000	26,000
Code word	Ummoj	Ummuk	Ummyl	Umnag	Umneh	Umnij

Digitized by Google

THE LIBERTY MACHINE TOOL CO.

HAMILTON, OHIO, U. S. A.

Manufacturers of Planers

LIBERTY PLANERS:

Are made in the following types and sizes:

Standard Planers from 22″ to 72″.
Widened Planers from 24″x22″ to 84″x72″.
Open Side Planers from 24″ to 72″.
Frog and Switch, Locomotive Cylinder, and **Special Planers** for all purposes.

IMPORTANT FEATURES:

Variable speeds.
Patented quick change feed mechanism.
Quick acting shifting mechanism.
Box type table.
Aluminum driving pulleys.
Self-oiling bronze bearings.
Wide belts.
Heavy gearing.
Large driving shafts.

SAFETY FEATURES:

All gears covered.
Bed closed between Vee's.
Solid web driving pulleys.
Stationary feed handles.
Self-releasing tumbler lock.
Automatic cross rail elevating device.

OUR FACILITIES:

Include all the modern equipment and conveniences, essential to the manufacture of *high grade* planers.

We have a complete equipment of jigs and fixtures for all size planers, making all parts interchangeable.

Extensive experience in our line has developed the improved design and construction of our planers, making them rigid, durable and convenient, and adapting them to all classes of work required of a modern planer.

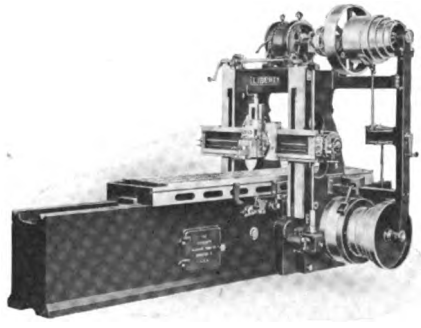
MATERIALS and WORKMANSHIP:

The best of materials and superior workmanship make it a *quality planer.*

POWER APPLICATIONS:

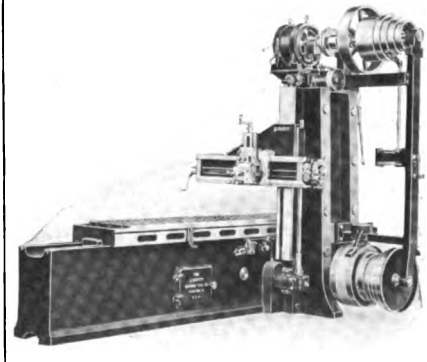
ALL LIBERTY PLANERS can be furnished with:

Plain single speed countershaft,
Two speed countershaft,
Constant speed motor drive,
Electric variable speed motor drive, or
Reversing motor drive, as desired.



24″ STANDARD PLANER

With patented variable speed belt drive. Can be furnished with either A. C. or D. C. constant speed motor drive as shown or belted direct from line shaft.



24″ OPEN SIDE PLANER

With patented variable speed belt drive.

ADDITIONAL EQUIPMENT:

Such as rail heads, side heads, or motor drive can be furnished at any time after machine is installed.

Open Side Planers can be furnished with left hand housing, and side head, or supplemental support for extra wide work, as desired.

SERVICE:

We are prepared to handle your difficult planing problems and may have some valuable suggestions in connection with same.

We welcome inquiries regarding our products, and will be pleased to furnish catalogues upon request.

Digitized by Google

Machine Tools, Steam Hammers, Traveling Cranes

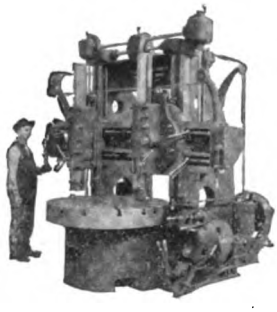
NILES-BEMENT-POND COMPANY

GENERAL OFFICES, 111 BROADWAY, NEW YORK

BOSTON	CLEVELAND	ST. PAUL
PHILADELPHIA	CINCINNATI	LOS ANGELES
BIRMINGHAM	DETROIT	SAN FRANCISCO
ROCHESTER	CHICAGO	SEATTLE
PITTSBURGH	ST. LOUIS	LONDON

Manufacturers of Steam Hammers, Electric Traveling Cranes and Complete Machine Tool Equipment for General Machine Shops, Railroad Shops, Ship and Navy Yards and Heavy Ordnance or Small Arms Arsenals

MACHINE TOOLS:



We build heavy machine tool equipment for shops of every size.

For railroad manufacturing and repair shops.

For general manufacturing.

For shipyards, dry docks, and navy yards.

For small arms arsenals, gun and projectile manufacturing plants.

These machines are representative of the best practice in tool construction. They include Lathes, Planers, Boring Mills, Slotters, Drilling Machines, Milling Machines, Shapers, Boring and Drilling Machines, Boring, Drilling and Milling Machines, Shears, Punches and Presses, etc.



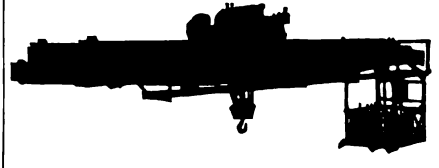
STEAM HAMMERS:



Bement Steam Hammers are built in single-frame, double-frame and drop-hammer types. They are entirely dependable and are so designed that with very little attention they can be operated continuously without breakdowns. In their construction only the best material and workmanship are used.

TRAVELING CRANES:

We build various types of Electric Traveling Cranes, trolleys and hoists. They are designed to obtain the highest operating efficiency with the lowest cost of maintenance. We are at all times ready to aid you in the solution of your handling problems.



Catalogues, Circulars and Full Information on request.

Digitized by Google

PRATT & WHITNEY COMPANY

GENERAL OFFICES, 111 BROADWAY, NEW YORK

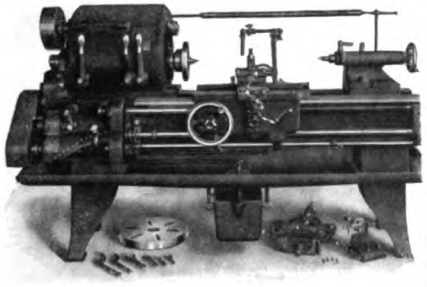
WORKS: HARTFORD, CONN.

Warehouse Stocks in

BOSTON	CLEVELAND	ST. PAUL
PHILADELPHIA	CINCINNATI	LOS ANGELES
BIRMINGHAM	DETROIT	SAN FRANCISCO
ROCHESTER	CHICAGO	SEATTLE
PITTSBURGH	ST. LOUIS	LONDON

Manufacturers of Precision Machine Tools, Small Tools, Gages and Standards, Hoke Precision Gages, P. & W. Measuring Machine, also Builders of Jigs and Fixtures and Special Manufacturing Equipment. Complete Equipments for Small Arms Arsenals

PRECISION MACHINE TOOLS:



As originators of the system of interchangeable manufacture, Pratt & Whitney Company have developed a line of Precision Machine Tools unequalled for accuracy and refinement. They include Bench, Engine and Turret Lathes, Hand Screw Machines, Hand and Power Milling Machines, Die Sinkers, Sensitive and Multiple Spindle Drills, Vertical Surface Grinders, etc. Special and original with us are Automatic Milling Machines, Horizontal Automatic Profiling and Cam Cutting Machines, Vertical Shapers, Jig Boring Machines, Contour Cutter Grinder, Thread Miller and Spline Miller.

SMALL TOOLS:

Pratt & Whitney Small Tools enjoy an enviable reputation for high quality. Where stamina as well as accuracy are required of the small tool equipment, Pratt & Whitney tools have more than held their own. We can honestly recommend them—our line is complete. They include Taps, Dies, Reamers, Milling Cutters, Punches, Drills, Special Tools, etc.





GAGES AND STANDARDS:

Recent developments in Pratt & Whitney Gage manufacture are the Hoke Precision Gages, "Mike-checks," Tool-



makers' Flats. By means of the Hoke Precision Gages accurate measurement to within five millionths of an inch is made possible and guaranteed. We also supply a full line of standard Thread Gages, Plug and Template Gages, Snap Gages, M. C. B. Gages for railroad use, as well as special gages for multiple manufacturing.

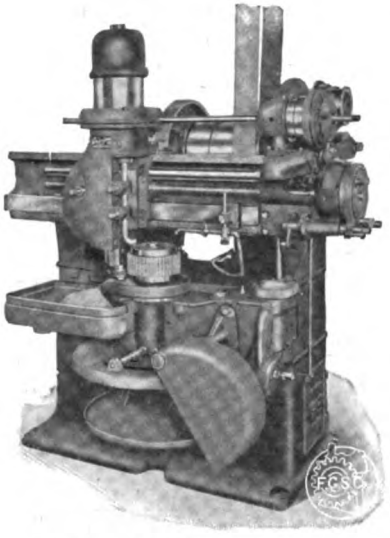
Catalogues, Circulars and Full Information on Request.

Digitized by Google

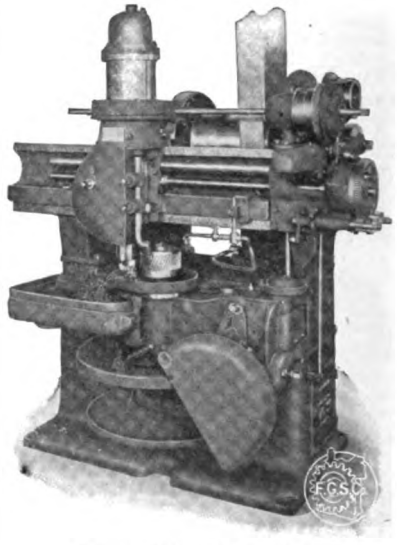
THE FELLOWS GEAR SHAPER CO.

SPRINGFIELD, VERMONT, U. S. A.

Sole Makers of Fellows Gear Shapers and Gear Shaper Cutters



Fellows 35-Inch Spur Gear Shaper



Fellows Helical Gear Shaper

THE SPUR GEAR SHAPER:

The Fellows Spur Gear Shaper is a generating machine, designed especially for the accurate and economical production of spur, external, internal, shoulder and cluster gears. It is made in a variety of types to accommodate various classes of work, and has a capacity for cutting external spur gears having a pitch diameter of 35 inches, 4 diametral pitch, 5 inches face; and internal spur gears having a pitch diameter of 25 inches, 4 diametral pitch, 3 inches face.

The modifications made in this machine comprise different diameters of work-spindles and cutter-spindles, so that it can be adapted to hold shank gears having shank diameters up to and including 5 inches. It is also adapted to use 4-inch cutters having a 1¾-inch instead of 1¼" hole, which is the size of hole in the 3" standard cutter.

The sizes of machines using gear shaper spur cutters having a 1¼" hole are designated as the Nos. 61, 64 and 612, whereas the sizes using 4-inch cutters having 1¾" hole, are designated as Nos. 62 and 624. These two machines are recommended for cutting coarse-pitch gears, capacity being ¾ pitch.

THE HELICAL GEAR SHAPER:

The Helical Gear Shaper embodies the same principles as the Spur Gear Shaper, with the addition that it can be used for cutting helical and herringbone gears. Helical guides—right- and left-hand—and having the same helix angles as the cutter, control the latter in its action on the work, and therefore give a uniformity and positiveness of control that is not obtained in any other gear cutting machine.

The Helical Gear Shaper is also made in several different types to accommodate various classes of work; but uses only one size of cutter—3½" pitch diameter having a 1¼" hole. The capacities of the Helical Gear Shaper are: external helical gears, 26" pitch diameter, 5" face, $^5/_7$ diametral pitch; internal helical gears, 24" pitch diameter, 3" face, $^5/_7$ diametral pitch. The different sizes are designated as Nos. 65, 615 and 645.

The No. 645 machine is particularly adapted to the cutting of reduction gears of the helical and herringbone types, as it has a large hole through the work-spindle to accommodate reduction pinion shanks.

Digitized by Google

THE FELLOWS GEAR SHAPER CO. SPRINGFIELD, VT.



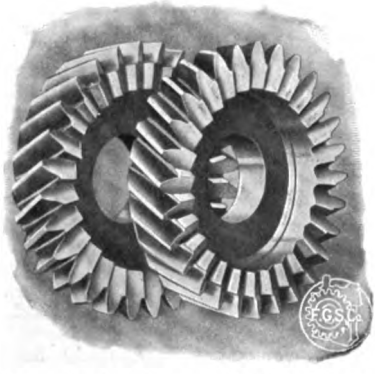
Fellows Spur Gear Shaper Cutter

THE SPUR CUTTER:

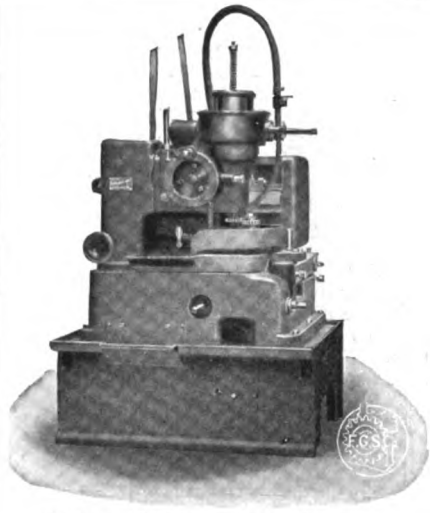
The Spur Gear Shaper Cutter is a unique gear cutting tool. It is made from high-speed steel, ground all over after hardening, the involute curves being generated by a precision grinding process. It is a production tool in every sense of the term, and can be applied to a variety of other shapes than gear teeth.

THE HELICAL CUTTER:

The Helical Gear Shaper Cutter is made in pairs—right- and left-hand. It is also made from high-speed steel, and ground all over after hardening, including the helical teeth, which are generated by a precision grinding process.



Right- and Left-Hand Helical Gear Shaper Cutters



Fellows 7-Inch Spur Gear Shaper

NO. 7 FELLOWS GEAR SHAPER:

This is a new type of Gear Shaper, designed to meet the requirements of those manufacturers having a large number of gears of one particular size to cut. It has a capacity for external spur gears, 7″ pitch diameter, 1⅛″ face, ⁶/₈ diametral pitch. By a slight modification it can cut internal gears having a capacity of 5″ pitch diameter, ¾″ face, ⁶/₈ diametral pitch. It is also adapted to the cutting of shank and cluster gears, and possesses wonderful production possibilities.

LITERATURE ON GEARING:

Literature covering the different types of Gear Shapers and Cutters briefly described in the foregoing, will be sent to those interested. In addition, we have also published a number of interesting booklets dealing with the subject of gear design and gear cutting. A few of the titles are:

"Commercial Gear Cutting,"
"The Involute Gear,"
"The Stub-Tooth Gear,"
"The Helical Gear,"
"The Internal Gear".

SEE OUR ADVTS. IN MECHANICAL ENGINEERING THE JOURNAL OF THE A.S.M.E.

These booklets are for general distribution to those interested in the subject of gearing.

Digitized by Google

BARBER-COLMAN COMPANY

ROCKFORD, ILL., U. S. A.

Manufacturers of Hobbing Machines, Hobs and Milling Cutters

BARBER-COLMAN HOBBING MACHINES:

The Barber-Colman Hobbing Machines are generating machines for producing Spur and Spiral Gears, Sprockets (roller, block and silent chain types), Ratchets and Spline Shafts.

B-C Hobbing Machines are designed primarily as high production machines to meet the demands for accurately finished work combined with high rate of production. They are made in three sizes designated as No. 2, 3 and 12.



No. 12 Barber-Colman Hobbing Machine

No. 12 B-C Hobbing Machine: This size has a capacity of 12″ diameter and 10″ width of face; cutting gears of 3 diametral pitch and finer in cast iron and 4 diametral pitch and finer in steel. Hole through work spindle $1\frac{17}{32}$″ enlarged to No. 12 B & S taper at the front end. Floor space 43″ x 76″; net weight approx., 4000 lbs.



No. 3 Barber-Colman Hobbing Machine

No. 3 B-C Hobbing Machine: This size has a capacity of 5″ diameter and 7″ width of face; cutting gears of 12 diametral pitch and finer in either cast iron or steel. Hole through work spindle $\frac{29}{32}$″ enlarged to No. 9 B & S taper at the front end. Floor space 30″ x 50″; net weight approx., 1700 lbs.



No. 2 Barber-Colman Hobbing Machine

No. 2 B-C Hobbing Machine: This size has a capacity of 3″ diameter and 7″ width of face; cutting gears of 24 diametral pitch and finer in either cast iron or steel. Hole through work spindle $\frac{29}{32}$″ enlarged to No. 9 B & S taper at the front end. Floor space 25″ x 41″; net weight approx., 1100 lbs.

HOBBING SPLINE SHAFTS:

The B-C Hobbing Machines can be equipped with special equipment to accommodate work of various types and design. With the use of a Draw-in Collet Chuck or Floating Chuck there is provided a means for holding shafts to be splined, of various lengths.

For hobbing shafts of extra large diameter special work spindles can be furnished with enlarged hole through the spindle. Shafts of unusual length can be accommodated by equipping machine with a special overhanging arm carrying a rear bracket and center.

VERTICAL FEED ATTACHMENT:

For generating Worm Gears and similar forms, which cannot be cut by feeding the hob horizontally across the work, a Vertical Feed Attachment can be furnished. When using this attachment the hob slide is stationary and the work is automatically fed into the hob.

This attachment particularly adapts itself to the cutting of spiral gear teeth on cam shafts.

Digitized by Google

BARBER-COLMAN COMPANY — ROCKFORD, ILL.

BARBER-COLMAN HOBS:



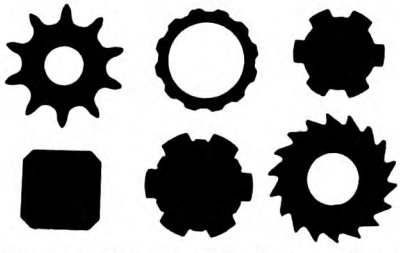
Ground Gear Hob

Barber-Colman Hobs are made on specially constructed machines, designed and built in our own plant. They are made with uniform relief so the form may be retained throughout the life of the hob. The greatest care is taken in the selection of the steel from which they are made, and careful scientific heat treatment is given to get the best possible cutting quality at high production speeds.

Formed Hobs give results satisfactory for ordinary requirements. Where extreme accuracy and absolute uniformity are required we recommend Ground Hobs, that is, hobs with the sides and tops of the teeth ground after hardening. This gives a hob that is correct as to form and size.

Hobs to cut spur and spiral gears in the pitches most commonly used are carried in stock. Hobs for other pitches and special shapes are made to order on short notice.

B-C Hobs can be furnished for every use that hobs can be put to and for any machine.



A few special forms adaptable for cutting on B-C Hobbers

BARBER-COLMAN MILLING CUTTERS

are accurate and dependable. The workmanship and material are guaranteed.



Standard Type Side Mill



Special Staggered Tooth Side Mill

The B-C line is complete, including all the standard types, as well as furnishing cutters of any special type or design.



Standard Coarse-Tooth End Mill



Special Helical Mill on Shank

We retain efficient engineers to cooperate with our customers in the designing and making of cutters to meet their needs.



Special Formed Cutter

When ordering Formed Cutters send drawing or sample of work.

Standard cutters are carried in stock, prompt delivery given on special designs.

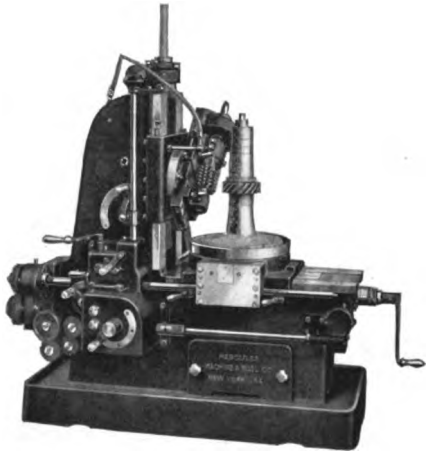
If you are not provided with a copy of our catalog, "Milling Cutters and Hobs," write for it.

Digitized by Google

THE HERCULES MACHINE AND TOOL COMPANY, INC.

SALES OFFICE
Broome and Lafayette Streets, NEW YORK

WORKS
Astoria, L. I., N. Y.



The Twenty-four-Inch Hercules Gear Hobber, with a capacity up to gears of 30-inch outer diameter and 12-inch face, is developed particularly to meet the demand for cheap and intensive manufacture of gears for automobile and tractor transmissions, change gears, machine tool drives, and the numerous gears of medium size used in the construction of commercial mechanisms of one kind or another.

To obtain an effective form of transmission with high speed gearing (attainable only if the arc of contact between meshing teeth is long and the load on engaged teeth gradually applied), the helical form of gear is recommended.

The difficulty in producing this type of gear and the relative high cost of production has heretofore prevented its more universal use.

Spiral gear production on the ordinary type of machine, entails troublesome and complicated computations. The three intimately correlated factors, feed, spiral and index, must be calculated simultaneously, which, at the best, is an arduous task. With the HERCULES Gear Hobbers, due to their distinctive differential, these factors are set and controlled by individual mechanisms working together, reducing the calculations to a simple arithmetical problem and resulting in mathematically and theoretically correct gear.



The Eight-Inch Hercules Gear Hobber is adapted to the generation of all precise spur, spiral and worm gears up to a maximum outer diameter of 8-inch and an extreme face of 6-inch, and is designed especially for the rapid and economical production of the accurate, small gears required in the construction of high grade typewriters, adding machines, phonographs, moving picture apparatus, speedometers, magnetos, timing gears and other mechanisms of mechanical refinement.

On HERCULES gear Hobbers, feeds per revolution of work may be changed without affecting the helix angle. Right and left hand gears of the same angle may be hobbed without altering the train of gearing.

The simplicity and accuracy of calculating the necessary change gears for spiral gear generation on the HERCULES Gear Hobbers, make it the most logical and most economical machine for generating all forms of spiral gears.

The production of all types of externally meshing gears of any form tooth equally spaced on a cylindrical base, can be undertaken on the HERCULES gear hobbers expeditiously and cheaply.

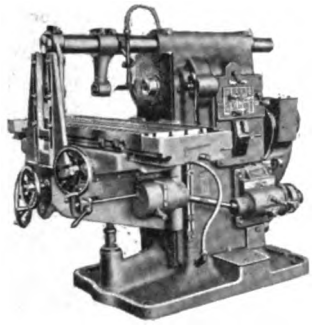
NOTE: With the assistance of the HERCULES Gear Hobbers we can convert your spur gear drive to spiral drive without altering the center distances and ratios.

Digitized by Google

BROWN & SHARPE MFG. CO.

PROVIDENCE, R. I., U. S. A.

Machine Tools—Small Tools—Cutters



MILLING MACHINES:

Universal, Plain, Automatic and Vertical, ranging from Light Hand Milling Machines to the Heavy Service Type.

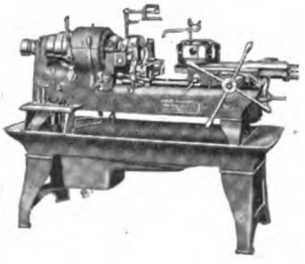
MILLING CUTTERS AND HOBS:

A complete line of over 3,000 sizes, including Gear Cutters. Special Cutters and Hobs made to order.



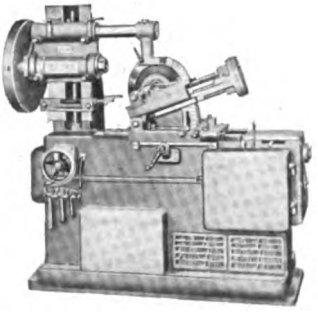
GRINDING MACHINES:

Universal, Plain, Surface, Tool and Cutter meet every demand for high grade commercial grinding as well as the most accurate tool room work.



SCREW MACHINES:

Plain, Wire Feed and Automatic for the manufacture of duplicate parts in large quantities.



AUTOMATIC GEAR CUTTING MACHINES:

Spur and Bevel. A range greater than the ordinary demands require. Spur Gears to 72″ diameter; Bevel Gears to 24″ diameter.

MACHINISTS' TOOLS:

A complete line for operator, tooll maker, machinist or toolroom. Over 1,000 varieties.

Catalog on Request.

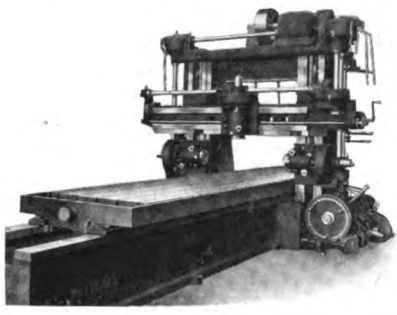
Digitized by Google

THE INGERSOLL MILLING MACHINE CO.

ROCKFORD, ILLINOIS, U. S. A.

DETROIT: David Whitney Bldg.
NEW YORK: 50 Church St.
LONDON: Burton, Griffiths & Co.
PARIS Fenwick Freres & Co.

Milling Machines and Their Equipment



Ingersoll Three Head Adjustable Rail Milling Machine

INGERSOLL MILLING MACHINES:

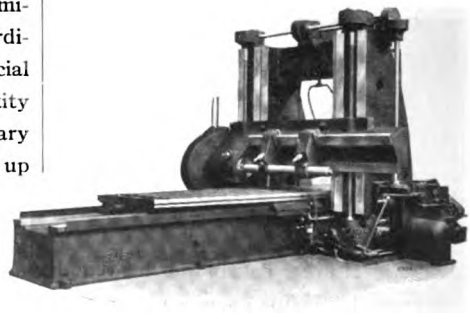
The Ingersoll Milling Machine Company is the largest exclusive builder of heavy Milling Machines and their equipment in the world. For the past thirty-five years, it has devoted its entire effort to the single study of milling machine problems. Today, the information thus gained is available for use in the design and building of the many different types of Ingersoll Mills and milling cutters.

We are prepared to build milling machines on which a number of different operations can be performed, for use in shops where work is diversified, or semi-special machines to fit the needs of ordinary multiple production, or special machines adapted only for large quantity production. These machines may vary in weight from a few thousand pounds up to 20 tons each.

The Ingersoll Adjustable Rail Milling Machine is built to meet general shop conditions. It is extensively used in general manufacturing and jobbing shops for milling steam engines, textile machinery, pump and printing press parts, valve fittings, machine tool frames and beds, and on other work of a similar character. It is best adapted to shops where the work to be handled is of varying sizes, requiring a wide range machine.

Where large numbers of duplicate parts are to be milled, the Fixed Rail type is better suited than the Adjustable Rail type. It is used extensively in shops building small pumps, motors, engines, cases and, in fact, all shops having quantity production requiring milling.

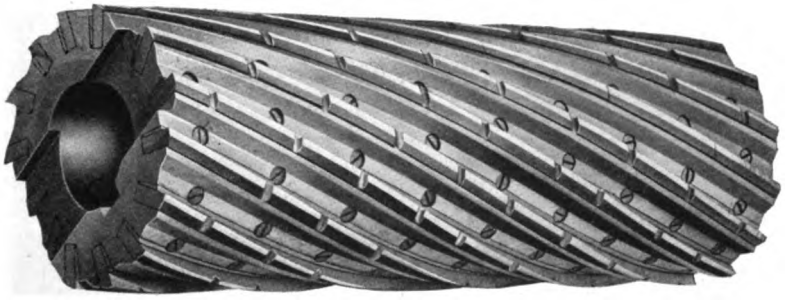
In addition, we design and build many other types, including the Ingersoll Rotary, Circular and Drum Type Continuous Milling Machines—special automatic mills, both reciprocating and single. The machine best suited to any individual job can be best determined only after a thorough investigation. This we are prepared to make and will gladly do so at your request.



Ingersoll Horizontal Spindle Milling Machine

Digitized by Google

THE INGERSOLL MILLING MACHINE CO., ROCKFORD, ILL.



Ingersoll Helical Slabbing Cutter

MILLING CUTTERS:

In order that Ingersoll Milling Machines could produce to their maximum efficiency it has been necessary for us to spend a great deal of time and study producing cutters capable of absorbing all the power of the machine.

The Inserted Tooth Cutter is an Ingersoll specialty. Carefully developed after intensively studying thousands of milling installations, these cutters are showing their vast superiority over the ordinary type of cutters, not only in regard to



Ingersoll Type "R" Inserted Tooth Milling Cutter

quantity, but also in regard to quality, and economy in operation. Inserted Tooth Cutters are easy to keep in good condition and when, after long use, the teeth are no longer fit for service, they can be easily and economically replaced.

We have standardized and carry in stock a complete line of cutters for face milling steel, aluminum or cast iron. We are also equipped to furnish arbor mills, solid mills, or special inserted tooth profile mills.

In ordering cutters, it is always desirable to have blue prints of your work so that we can quote on the most practical cutter for the job.



Ingersoll Type "X" Inserted Tooth Milling Cutter

Digitized by Google

KEARNEY & TRECKER
CORPORATION

MILWAUKEE, WIS., U. S. A.

CHICAGO OFFICE
631 Washington Blvd.

CLEVELAND OFFICE
738 Superior Ave., N. W.

NEW YORK OFFICE
1801 Singer Building

Manufacturers of Milling Machines, Attachments and Accessories

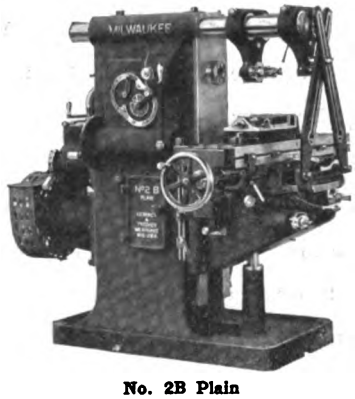
MILWAUKEE MILLING MACHINES:

Double Overarm
Constant Speed Drive
Automatic Flooded Lubrication

The Double Overarm is clearly shown by the half-tone engravings. It consists of two steel bars arranged accurately parallel with the spindle at sufficient distance apart to form a rigid truss when the arbor supports are clamped to them.

The Work Table is made of semi-steel and is finished all over, as experience has shown that where scale is left on one side the table does not long retain its accuracy.

480



No. 2B Plain

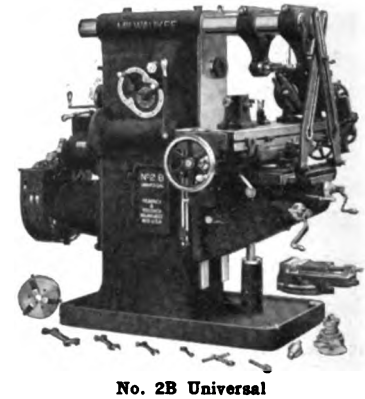
The Box Section Knee has no slot through the top to close under pressure of the saddle clamp or strain of the cut.

The Flanged Spindle provides means for efficiently holding cutters and driving them in either direction. The hardened steel arbor drive collar also provides an ideal drive for the arbors.

The Spindle Reverse is contained within the machine so that right- or left-hand cutters can be used without reversing the driving belt.

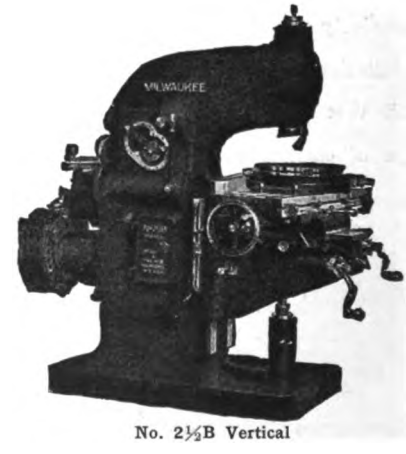
The Drive is through a single pulley running at a constant speed, giving 18 spindle speeds in geometrical progression of about 20 per cent.

The Lubricating System consists of a reservoir in the base of the machine holding several gallons of machine oil



No. 2B Universal

that is pumped to the top of the machine and distributed by a perforated pipe to all gears and bearings in the main frame and feed box, flooding downward on its way back to the reservoir. All oil grooves are cut through so that the oil will wash away any foreign material and keep the bearings in condition.



No. 2½B Vertical

A Cutter Lubricant Pump is provided on every machine as all machines are usually used on steel or other material requiring lubricant. Adequate provision has been made for the return of the lubricant to the reservoir.

Catalogue, describing our complete production in detail, mailed on request.

Digitized by Google

THE KEMPSMITH MFG. CO.

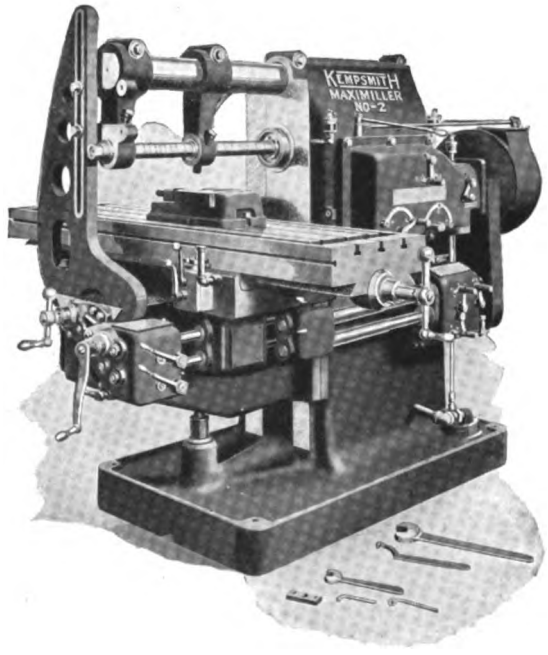
MILWAUKEE, U. S. A.

Manufacturers of Milling Machines and Equipment

KEMPSMITH MILLING MACHINES:

are built in three sizes each in the Plain and Universal Cone Types. We build a geared-head line called the Maximillers in both the Horizontal and Vertical Types and our No. 33 Production Miller, which is designed for the rapid production of duplicate parts in large quantities.

This wide range of types and sizes permits the choice of a machine for all classes of work from the finest precision instruments to the heaviest automobile and aeroplane engines, tractor and agricultural machinery.



No. 2 Plain Maximiller

Machines can be equipped with a wide variety of attachments including the Vertical, Circular, Universal, Cam, Slotting Attachments; Dividing Heads, Index Centers, etc., which greatly increase their capacity.

The Maximiller line has many exclusive patented features some of which are the wedge locked overarm, which keeps the arbor in positive alignment with the spindle. The self-contained spindle reverse; the splash lubrication system by means of which the entire feed and speed train constantly run in oil; the solid top knee with the cross feed screw located directly in the center of the knee; the power rapid traverse of the three movements of the table, which does not affect the rate of feed that is in use.

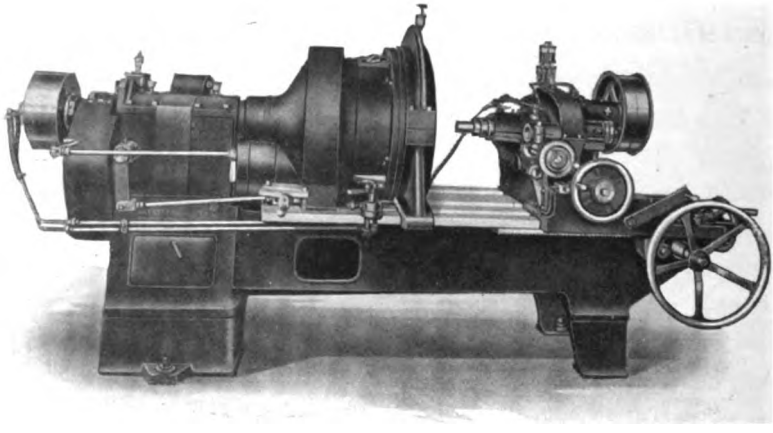
We shall be very glad to furnish a catalogue which completely illustrates and describes our entire line.

Digitized by Google

SMALLEY-GENERAL COMPANY, INC.

BAY CITY, MICH.

Manufacturers and Builders of Machinery



SMALLEY GENERAL THREAD MILLERS are sturdy, powerful, accurate
482 machines of the highest quality of material and workmanship designed to do the heaviest and most exacting work. Will mill threads with greater accuracy and speed and at lower cost than can be obtained by other methods. Will mill threads with one revolution of the work when multiple tooth hobs are used. The entire lubrication system is of liberal design and reliable. Clean cutting lubricant assured in ample quantities. Fully equipped with grease cups and self-closing oil cups. Belt or motor drive.

Various sizes and types of chucks may be used. Our Engineers will recommend methods of chucking.

NO. 1 THREAD MILLER:

Capacity: Made in two sizes.
Size A—27 in. by 3 ft. 2 in.
Size B—27 in. by 4 ft. 8 in.

Will mill external, internal, right hand, left hand, straight or taper threads up to 6 in. in length or 16 in. in diameter.

Designed for two speeds, milling or low and turning or high.

NO. 23 STANDARD THREAD MILLER:

A single purpose machine for production work, that has three turning speeds proportional to three milling speeds.

Capacity: 9 in. O. D. and 13 in. I. D., threads with 2-in. diameter hob. 21 changes of threads from 3½ per inch up on chucking type.

Equipped with hollow spindle for chucking long pieces.

SERVICE:

Send us blue prints of your threading problems. Actual samples sent at our expense would be still more satisfactory. With preliminary data in hand our Engineering Department would be pleased to give you an accurate time-study.

NO. 1 FLANGE THREAD MILLER:

For milling and facing standard flanges up to and including 16 inches diameter.

These machines are especially adapted for:

Milling and facing pipe flanges at one chucking.
Steep taper threads for oil-well tools
Chasers and taps
Automobile parts
Taper threads of all kinds
Straight threads of all kinds
Form circular milling
Continuous face milling
Cuts threads from 2 to 30 pitch

Smalley General Thread Millers will only be sold with the approval of our Engineering Department. A guaranteed production estimate will be furnished with each machine. In the event a machine should not perform and produce according to our guarantee, the purchaser will have the unquestioned right to cancel the sale.

Digitized by Google

THE OILGEAR COMPANY

60–62–64 27TH ST., MILWAUKEE, WIS.

Manufacturers of Variable Speed Oil-Pressure Power Transmission Devices

Feed Control Systems adapted for all medium and heavy machine tools, and for many other purposes. Feed Controller (A in Fig. 1) contains variable delivery feeding pump, large gear pump for rapid traverse of tool carriage, and control valve. By simply moving control lever to various positions on either side of center an infinite range of feeds in either direction is obtained. Extreme positions of control lever connect gear pump to feeding motor giving rapid traverse of tool carriage in either direction.

Tool carriage or ram travel either by rotary oil motor (B in Fig. 1) or by direct acting pushing cylinders.

All Feed Control units are manufactured to interchangeable standards and kept in stock. When building a special machine requiring accurately controlled movements OILGEAR Feed System will save its cost in drawings and patterns alone, besides saving delay by making it unnecessary to design feed gearing.

Standard OILGEAR feed units may readily be applied to new machine tools if prints and feed requirements are sent to us in advance. It avoids all change gearing besides providing instant changes of feed and rapid traverse at the operator's hand. Working parts few and simple. Ball and roller bearings. Does not wear and cannot be broken by running against obstructions or by excessive cuts. A pressure gauge on feed motor shows feeding force required and indicates dull or broken tools.

OILGEAR feed may be profitably installed on old machines which are hard to operate, or where feed gear is weak or unsatisfactory. Many old tools may be modernized in this way with material increase in production.

Fig. 3. Shows OILGEAR Variable Speed Drive, for machine tools and other machines requiring perfect speed control. Length over bearings 24″. Height 20″. Capacity 10 to 15 H.P., according to speed. Usual speeds 600 to 750 R.P.M. Easily applied to heavy lathes, boring mills, etc., to replace cone pulley drive, thoroughly modernizing existing machines at a fraction of cost of new machine. Should be installed on new machine tools. Gives infinite speed range in either direction by simply moving control handle. Pressure overload gear absolutely protects both OILGEAR and machine tool. Cannot be overheated or damaged.

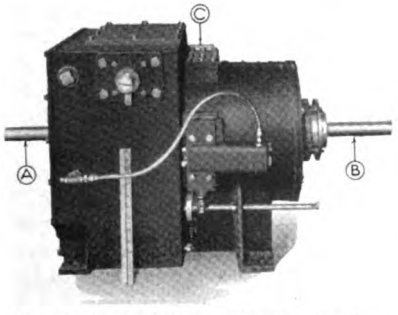


Fig. 3. OILGEAR Variable Speed Drive

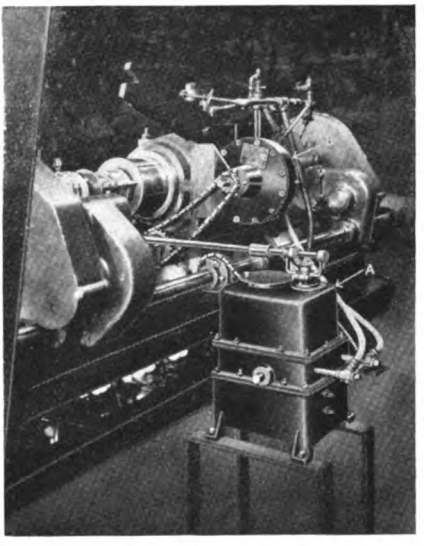


Fig. 1. OILGEAR Feed Controller and Rotary Feed Motor on double head boring machine on automobile work

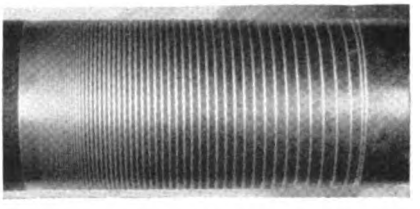


Fig. 2. Lathe cut on 4″ shaft. Feed changed from .003″ to $\frac{1}{16}$″ without stopping cut or leaving carriage

OILGEAR Variable Hydraulic Pumps are especially adapted for Hydraulic Presses (giving perfect control of both pressure and ram travel, requiring no accumulator). Also for broaching machines, hydraulic chucks, replacing air chucks, etc.

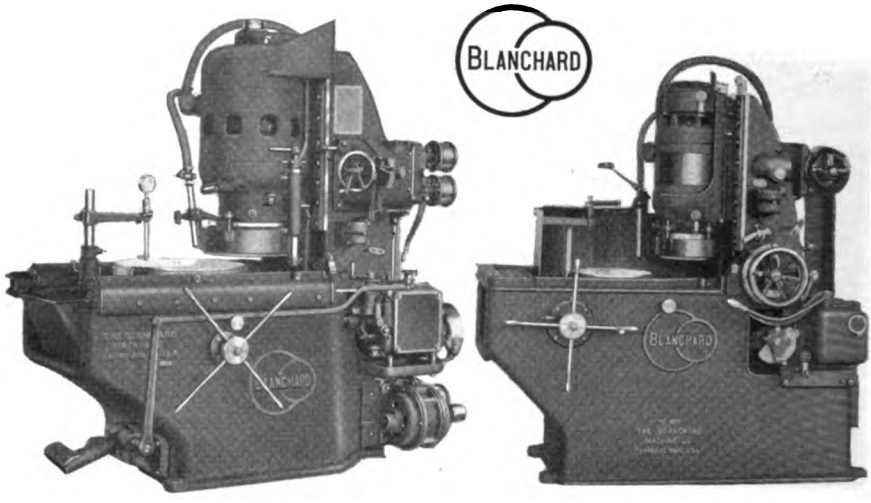
Send for bulletins and full information on OILGEAR Feed Control System, OILGEAR Variable Speed Drive, OILGEAR 20-Ton Hydraulic Press.

Digitized by Google

THE BLANCHARD MACHINE CO.

CAMBRIDGE, 39, MASS.

Blanchard High Power Vertical Surface Grinders



NUMBER 16 BLANCHARD GRINDER:

Direct Motor Drive Type
Range: 30″ dia. x 14″ high under new wheel
Wheel: 18″ dia. Chuck: 26″ or 30″ dia.
Motor on spindle, 25 H. P.
Weight of Machine, 9500 pounds

NUMBER 10 BLANCHARD GRINDER:

Direct Motor Drive Type
Range: 18″ dia. x 6″ high under new wheel
Wheel: 10″ dia. Chuck: 16″ dia.
Motor, on spindle, 10 H. P.
Weight of Machine, 6000 pounds

Note: Larger sizes are being developed and inquiries are invited regarding work beyond the capacities given above.

THE BLANCHARD GRINDER not only handles what are commonly considered surface grinding jobs, but also machines from the rough a wide variety of castings and forgings.

It is also the most rapid and economical tool for finishing small parts in quantities and is extensively used for such work as grinding the flat sides of ball bearing races, piston rings, chasers, small tools, thrust washers, etc.

Numerous repeat orders are constantly being received from firms who have used Blanchard Grinders on the most exacting production work for several years past. These are the best evidence of Blanchard economy and sustained accuracy.

Descriptive matter on request. Send blueprints or samples of your work for production estimates.

As compared with other methods of machining, Blanchard grinding has the following advantages:

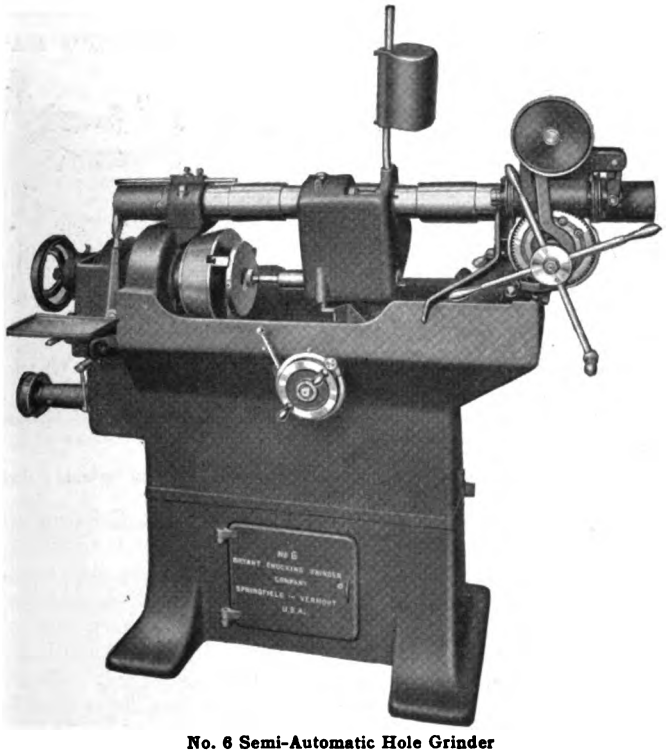
(1) Accuracy, both as regards size and flatness. (2) Excellent finish. (3) Large output per man. (4) Low total cost per unit of work. (5) Work is finished from the rough in one operation, thus saving rehandling. (6) Uniformity of product. (7) Fixture expense eliminated or reduced to a minimum. (8) Practically no setting-up time required. (9) The machine is quickly adaptable to a variety of work. (10) The accuracy of the Blanchard Grinder can always be maintained. (11) Output not subject to delays due to hard spots or sand in castings. (12) No expensive cutters to buy or maintain. (13) Very small floor space for the production obtained.

Digitized by Google

BRYANT CHUCKING GRINDER CO.

SPRINGFIELD, VERMONT, U. S. A.

Manufacturers of Chucking or Internal Grinders



No. 6 Semi-Automatic Hole Grinder

SPECIFICATIONS OF BRYANT SEMI-AUTOMATIC HOLE GRINDERS

	No. 6	No. 18	No. 20	No. 15	No. 15-A
Total Chuck Swing	12⅝″	27¾″	13½″	12⅝″	12⅝″
Maximum Wheel Slide Traverse	8″	11¼″	14¼″	11¼″	11¼″

Grinder Number 15 is furnished with two-spindle wheel slide for hole and face grinding, and when furnished in this way we call it Number 15-A. This makes it possible to make the two operations at a single holding of the work and insures accuracy for finished surfaces.

Bryant Chucking Grinders make unnecessary the use of arbors or center point supports. It has wheels for inside and outside—straight or taper grinding; wheels for face grinding and wheels for polishing. Internal holes ground with diameters of ⅜″ up.



Bryant Chucking grinders mean real precision interchangeable manufacturing. *Send for complete catalog.*

Digitized by Google

THE HEALD MACHINE COMPANY

WORCESTER, MASS.

Branches at New York Philadelphia Cleveland Detroit Cincinnati Chicago

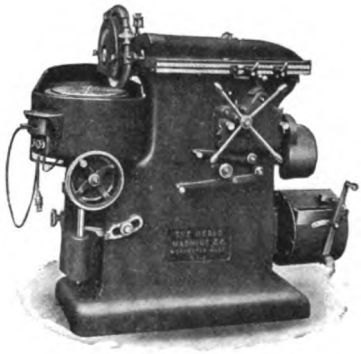
Manufacturers of Grinding Machines and Magnetic Chucks

PRODUCTS:

Internal, Surface and Cylinder Grinding Machines.

Magnetic Chucks.

SURFACE GRINDING MACHINES:



Style No. 22 Surface Grinder

Heald Rotary Surface Grinders are simple, accurate and highly productive machines for grinding either hardened or soft work such as dies, discs, collars, washers, saws, gauges, cutters, piston rings, or any other flat work. Owing to the fact that we build our own magnetic chucks, we are in a position to offer supplementary top plates which can be altered to hold certain classes of irregular shaped work. These machines have both automatic and hand feed for wheel slide. They will grind concave or convex and can be used wet or dry. Furnished in two styles: No. 20 which has an 8″ magnetic chuck, and No. 22 which has a 12″ magnetic chuck.

INTERNAL GRINDING MACHINES:



Style No. 70 Internal Grinder

Heald Internal Grinders are built to handle work which is easily revolved such as bearings, cutters, ball races, hardened gears, cylinders, gauges, cones, etc. They are primarily production machines, simple in design, built to maintain a fine degree of accuracy. The workhead swivels and is graduated in degrees and taper per foot. Can be equipped for wet or dry grinding. A radius truing device (extra) will either concave or convex the wheels for grinding curved surfaces.

Machine Style No. 70: Capacity 15″ swing x 11″ long. Has both power and hand feed to table. 12 sizes of instantly interchangeable wheel heads to select from.

Machine Style No. 75: Capacity 15″ swing x 8″ long. Construction is similar to No. 70, except has hand feed only for table.

Machine Style No. 80: Capacity 10″ swing x 3¾″ long. Handles holes ¼ to 2″ diameter. Has both power and hand feed for table.

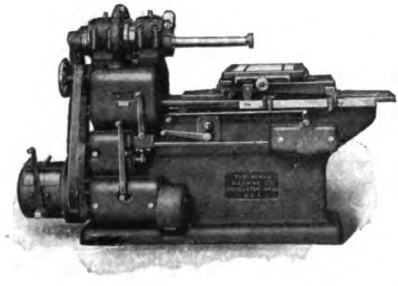
Machine Style No. 85. Capacity 10″ swing x 2½″ long. Holes ¼ to 2″ diameter. Hand feed for table only.

Digitized by Google

THE HEALD MACHINE COMPANY WORCESTER, MASS.

CYLINDER GRINDING MACHINES:

These machines are especially designed for internal grinding of holes in work of such shape that it is inconvenient or impossible to rotate it when machined in the usual manner. They are especially valuable for grinding airplane, marine or automobile engine cylinders. Moreover they make valuable equipment in railroad shops for grinding bearings in valve motion parts, side rods, bushings and air brake parts such as triple valves, etc. The work is easily handled due to such features as a large crosswise adjustment of the work, multiple feeds for rotation of the work, multiple feeds for travel of the table, quick-change gear boxes for feeds and speeds, micrometer readings throughout, centralized control of levers, and massive construction.



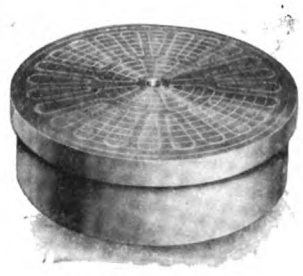
Style No. 65 Cylinder Grinder

Machine Style No. 65: Vertical adjustment is secured by means of an inclined slide located between the main table and cross slide table. Longitudinal movement of this intermediate slide raises and lowers the work. Recommended for manufacturers with large quantities of similar work.

Machine Style No. 55: Similar to No. 65 but having a vertical adjustment of 2½″ obtained by movement of a knee casting clamped to the bed. This machine is particularly suitable for regrinding motor cylinders or any shops where there is a variety of different size work requiring large vertical movement.

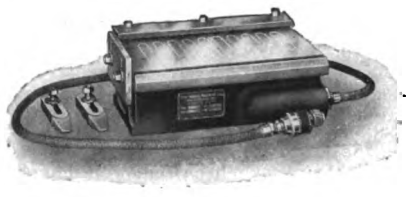
MAGNETIC CHUCKS:

Any iron or steel work that has a flat and fairly smooth surface can be held by a magnetic chuck for machining on milling, planing, grinding or shaping machines.



Heald Rotary Chuck

Heald chucks have a holding power of 100 to 220 lbs. per sq. in., depending upon the size of the chuck. They demagnetize completely; can be used wet or dry; hold uniformly over the entire surface; and are easily converted from 110 to 220 volts.



Heald Rectangular Chuck

Magnetic chucks greatly reduce the time required to set up work; lower the cost for special fixtures; increase the production of machines and the output of operators; handling work which could not be machined with mechanical fixtures. Built in rotary styles from 6″ to 24″ dia.; rectangular from 4″ x 10″ to 14″ x 36″. Styles up to and including 6″ x 18″ can be furnished with taper, swivel or combination bases.

SEE OUR ADVTS. IN MECHANICAL ENGINEERING THE JOURNAL OF THE A.S.M.E.

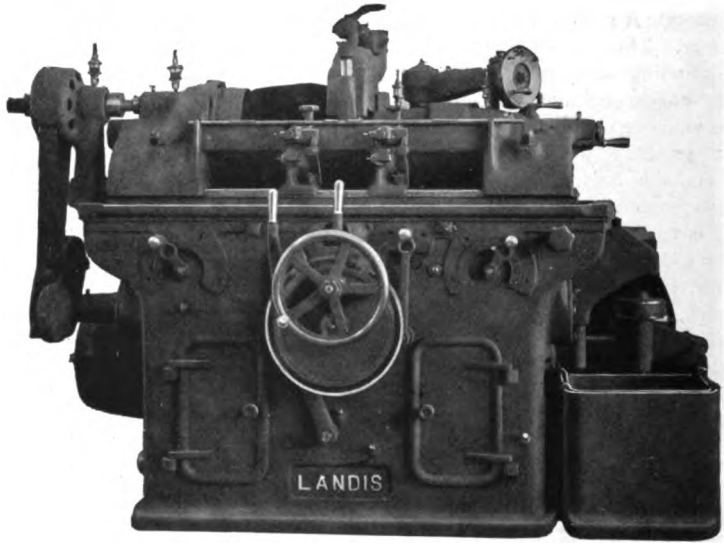
Digitized by Google

LANDIS TOOL COMPANY

WAYNESBORO, PA.

NEW YORK OFFICE: 50 Church St.

Manufacturers of Precision Cylindrical Grinding Machines



Improved Self-Contained Grinding Machine

Our regular line consists of the following types:

UNIVERSAL MACHINES: No. 1, No. 1½, No. 2, No. 3, No. 4 are used for finishing tools and a variety of straight or taper parts, both external and internal such as are common to the tool room, machine shop, railroad shops, etc.

Attachments, such as magnetic chuck, gear-cutter attachment, side mill grinding attachment, etc., can be used on these machines to advantage.

PLAIN GRINDING MACHINES: Sizes 6″, 10″, 12″, 20″, 30″, 40″ swings in standard lengths. These strictly manufacturing machines are intended for finishing straight and taper spindles, shafts, rolls, tubing and all other work which can be revolved on dead centers.

PLAIN GRINDING MACHINES WITH GAP are our 20″ swing Plain Machines, built with gap in the bed to suit the location of the projection on the work. Especially suitable for grinding locomotive piston rods.

INTERNAL GRINDING MACHINES for straight and taper internal grinding. The internal fixtures for these machines will grind holes ¼″ in diameter, or larger, and up to 12″ long.

CRANK GRINDING MACHINES for grinding single or multiple throw crank shafts used in gas and small steam engines.

ROLL GRINDING MACHINES for grinding chilled iron and hardened steel rolls.

CAM GRINDING ATTACHMENTS (for use on our plain and universal grinders) for grinding either detachable or integral cams.

BALL BEARING RACE GRINDING MACHINES for grinding the raceways in radial, thrust and cone ball bearings.

LANDIS

Our illustrated and descriptive catalogues and literature give detailed information. They also describe the features which stand for quick manipulation, accurately finished work, durability of alignments and rapid production—all of which are prominent in the various types of Landis Grinding Machine.

Digitized by Google

NORTON COMPANY

WORCESTER, MASS., U. S. A.

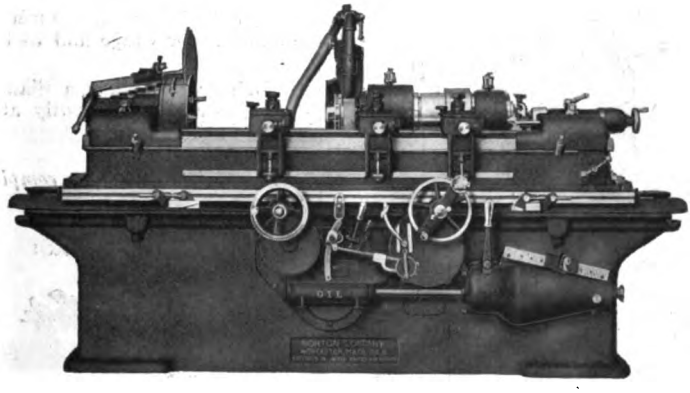
Cable Address: "NORCO"

A. B. C., Lieber's, Business, New Business Bentley, General and Western Union Codes

Manufacturers of Grinding Machinery

Branch Offices of Machine Division

PHILADELPHIA, PA., 324 Bulletin Bldg.
PITTSBURGH, PA., 608 Empire Bldg.
SYRACUSE, N. Y., 206 Keith Theatre Bldg.
INDIANAPOLIS, IND., No. 304 Pennway Bldg.
CLEVELAND, OHIO, 442 Engineers' Bldg.
HARTFORD CONN., Room 603, 49 Pearl St.
WORCESTER, MASS., 1 New Bond St.
NEW YORK, N. Y., 151 Chambers St.
DETROIT, MICH., 233 West Congress St.
CHICAGO, ILL., 11 North Jefferson St.



483

CYLINDRICAL GRINDING MACHINES

Type A

Swing 6″—10″—14″—16″—18″—20″—22″—24″—26″ and various lengths between centers.

Type B

A new self-contained machine—a radical departure in design from the Type A and capable of much greater production. 10″ swing 36″—48″—60″—72″ between centers.

CRANKSHAFT GRINDING MACHINES:

CAMSHAFT GRINDING MACHINES:

SURFACE GRINDING MACHINES:

Open side Planer Type. Width of table 15″, distance between wheel and table 17″. Length of tables—6′, 8′, 10′, 12′ and 14′.

ROLL GRINDING MACHINE:

Built to order.

CAR WHEEL GRINDING MACHINES:

For grinding mounted car wheels while revolving on their own journals.

TOOL ROOM GRINDING MACHINES:

Universal Tool and Cutter

No. 1—Swings 8″ or 10″. Takes 15″ between centers.

No. 2—Swings 10″ or 12″. Takes 32″ between centers.

Universal Multipurpose

A new single pulley drive self-contained Universal grinding machine, swings 12″, takes 36″ between centers.

RUNNING BALANCE INDICATING MACHINES:

A machine for locating errors in running balance of revolving parts such as crankshafts, fly wheels and clutches, small motor armatures, etc.

Send to nearest branch office for illustrated literature.

(See page 510 for additional products of this Company)

Digitized by Google

WILMARTH & MORMAN CO.

GRAND RAPIDS, MICH.

Manufacturers of Precision Grinding Machinery

NEW YANKEE DRILL GRINDERS:



Wilmarth & Morman New Yankee Drill Grinders will keep your drills in perfect condition. Your drills will have correct angles, proper clearance and equal cutting lips—and without the supervision of a skilled mechanic, because the New Yankee grinds AUTOMATICALLY.

490

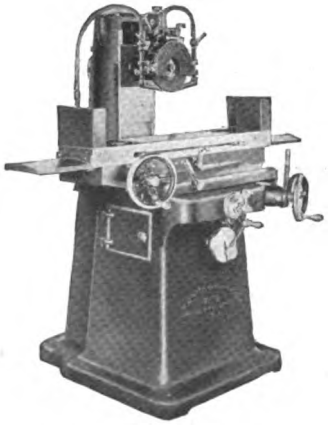
With New Yankee Drill Grinders you eliminate cutting oversize—drills splitting—drills overheating—loss of temper.

Thousands and thousands of users will testify that New Yankees (both wet and dry grinders) speed production and add life to their drills.

Made in combination with Wilmarth & Morman Tool Grinder. Will take drills from No. 52 to 4".

Send for new catalog.

SURFACE GRINDERS:



Surface Grinders built for Precision Work with reserve rigidity and strength to take .050 to .070 of an inch cut when desired.

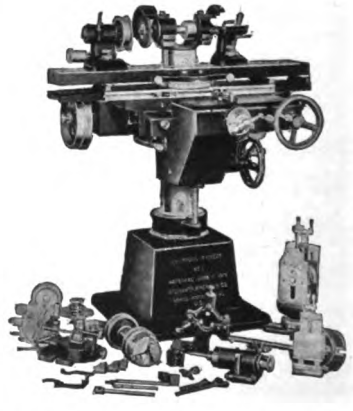
Unusually heavy design to eliminate vibration with its resulting chatter.

Also built as dry surface grinders, adaptable for gauge and tool work.

Each machine has a diamond wheel-truing device permanently attached and ready for instant use.

Be sure to write for complete information.

UNIVERSAL GRINDERS:



The Wilmarth & Morman Universal Cutter and Tool Grinder will accurately and speedily perform the following forms of grinding.

Internal.
Side, angle or face milling cutters.
Straight or taper reamers.
Face grinding.
Formed cutters.
Hobs.
Gears.
Saws.
Cylindrical.

Check your files and see if you have our new catalog.

Digitized by Google

THE BLAKE & JOHNSON COMPANY

Established 1849

MACHINERY DIVISION

WATERBURY, CONN.

SPECIALISTS

IN

MACHINERY

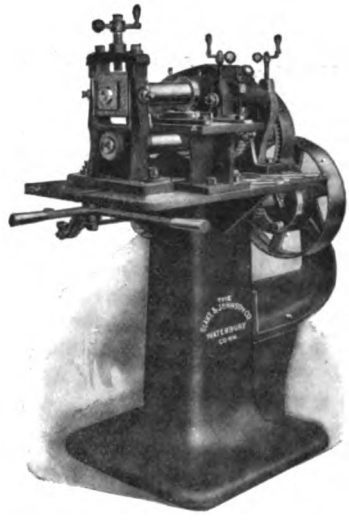
FOR

MANUFACTURING

METALS

IN

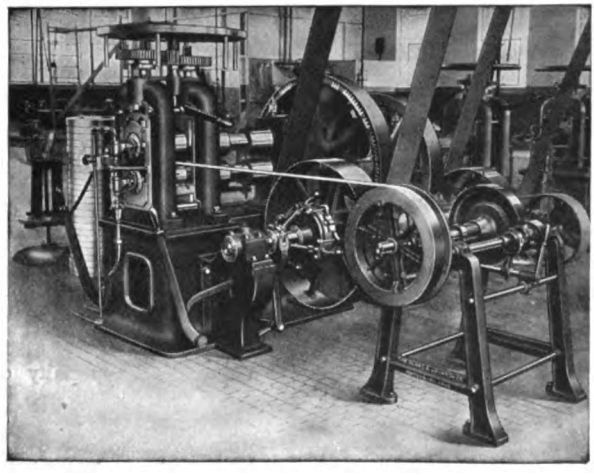
THIN GAUGES



COLD ROLLING MACHINERY

For Steel, Brass, Copper, Etc.

BUILDERS OF SLITTERS



Digitized by Google

DOVE-SMITH & SON

NIAGARA FALLS, N. Y.

Designers and Builders of Special Machinery, Tools and Gauges

We are prepared to design and build special machinery for any purpose, weight not to exceed 5 tons

Special Machine Tools

Jigs and Fixtures

492 Punches and Dies

Drum Shop Equipment

Special Thread Cutting

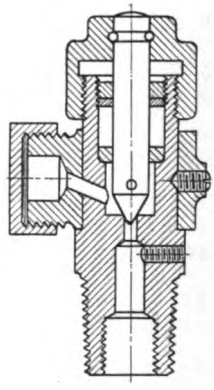
Paper Box Machinery

Dies for Rubber Works

Regrinding Rolls up to 20″ diam. x 10′ long

Carbonizing

Heat Treating



CHLORINE CYLINDER VALVES:

Furnished with renewable branch and all kinds of fusible plugs

---

Experimental Work

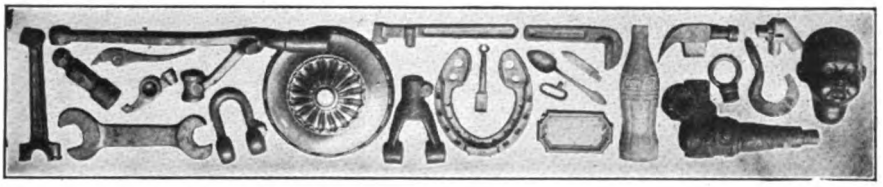
Inventors' Ideas Developed

We make a specialty of working to either metric or decimal dimensions

Digitized by Google

KELLER MECHANICAL ENGRAVING CO.

68 WASHINGTON ST., BROOKLYN, NEW YORK CITY



PRODUCTS:

Automatic Die Sinking and Mold Cutting Machines of many types to meet a wide variety of conditions and requirements.

THE KELLER METHOD AND PRINCIPLE:

The Keller Method is a mechanical system of die cutting which automatically produces dies, molds, etc., from a master, and separates the planning and laying out from the purely mechanical work of sinking and cutting.

The principle of the Keller Machines is that of a cutting or milling tool working in unison with a tracer or guide automatically or with hand control.

KELLER MACHINES ARE MADE IN A GREAT VARIETY OF TYPES:

Each meeting the conditions of the work for which it is designed. They are labor-saving machines in the fullest sense doing the work heretofore requiring labor of the highest technical skill.

ADVANTAGES:

The Keller Machine not only reduces benchwork to a minimum, but it also simplifies or replaces entirely, that part of the work done with hand fed machine tools. It eliminates form cutters, no matter how intricate the design or contour.

Beside lowering costs, the Keller Method saves time while maintaining uniform high quality. It eliminates the elements of uncertainty and chance inherent in the production of die and mold work by hand methods. The greater flexibility of the Keller Method is a great factor in reducing the burden of the die and mold departments.

SCOPE:

Dies for Forging (hot and cold) up to 72″.

Dies (male and female) for Pressing, Stamping, Embossing sheet metal, up to 72″.

Molds for Pressing glassware; for Blowing bottles; for rubber, celluloid and other compositions.

Core Boxes and Metal Patterns for foundry purposes.

Dies, Hubs and Forcers, for stamping silverware (flat and hollow) jewelry and medals.

Stamps and Punches for marking and embossing.

Rolls for marking and embossing on metals, paper, leather fabrics.

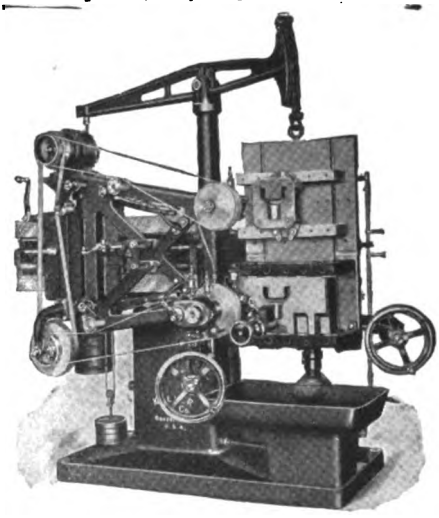
Molds for rubber tires.

A great variety of finished articles with irregular contours and formations, the machining or finishing of which present problems outside of the range of the shop equipment—(Examples—propellers, turbine wheels).

APPLICATION:

Some of the industries which Keller Die Sinking Machine is serving:

Automotive Industries
Car Works, Railroad Shops
Harvesting Machinery
Hand Tools, Cutlery, Small Arms
Marine and Builders' Hardware,
Saddlery and Harness Hardware
Brass and Metal Goods
Silverware and Jewelry
Glassware and Bottles
Rubber Goods, Drop Forging



Model "E-4" Keller Automatic Die Sinking Machine Cutting a Forging Die

TRADE KME MARK

Digitized by Google

NOBLE & WESTBROOK MFG. CO.

HARTFORD, CONN., U. S. A.

Manufacturers of Dwight Slate Marking Machines, Marking Devices of Every Description, Expert Die Cutting and Engraving, Filing Machines, Grinding and Polishing Machines

DWIGHT SLATE MARKING MACHINE

These Machines Will Mark Artistically Any Article or Any Material Suitable for Impressions.



Hand or Power Machines Recommended

A specialty of our line of manufacture is the making of devices and machines for placing on flat or round metal surfaces, impressions of trade-marks, patent dates, graduated scales and a variety of similar work. These machines are not expensive, are adapted to the work, do it in a superior manner at less cost than is possible on any makeshift devices.

A neat mark is desirable, adds to appearance of goods, and is a feature that the manufacturer cannot afford to ignore. Goods of all kinds are put on the market in more tasty and improved form than a few years since. Both trade and purchasers call for these qualities. Antiquated and clumsy designs that were "good enough" are rapidly being displaced by improved forms and finish. By using modern machinery this is done at saving of original cost; therefore, when we offer better work at less cost we ask its consideration. Samples or sketches of work are solicited, proper machines recommended, and complete outfits furnished.

SOMETHING ABOUT STEEL DIE CUTTING YOU OUGHT TO KNOW:

A good die is essential to satisfactory work. To be good, the die must be made from high grade steel. The lettering should be all hand engraved and cut from solid stock. Our method is to engrave away the stock, leaving the letters standing from the original, or in other words the cutting edge of the stamp is not disturbed and the result is more and clearer impressions from the die. We have conducted extensive tests and experiments for the benefit of our customers and are sure that dies furnished by us are the most economical and practical for marking various products.



Roll Die for Marking Flat Work in Our Marking Machines

We ask for your steel die and stamp orders, feeling that our exceptional knowledge of steel die making and marking, as well as our scientific methods and the long life of our dies merit your work, when quality is desired.

Digitized by Google

THE WHITNEY MFG. CO.

HARTFORD, CONN.

Chains—Keys and Cutters—Hand Milling Machines



"Whitney" Keys

"WHITNEY" KEYS AND CUTTERS:

For the Woodruff System

Used by the leading builders of automobiles and machine tools where strength, economy and absolute interchangeability are a necessity. Our customers state that sometimes it saves as much as 75% over the old method. The operation of cutting the key seat is simple and rapid and requires no skilled labor.

THE "WHITNEY" HAND MILLER:



Is invaluable in the LARGE FACTORY as no other design equals it for big production on interchangeable work, as proved by the thousands of these machines in constant use both here and abroad. One concern alone is using over 800 of these machines and many other concerns have over one hundred each.

The "Whitney" Hand Miller is also invaluable in the SMALL SHOP as it will handle a wide variety of operations with convenience, accuracy and rapidity. Soon pays for itself.

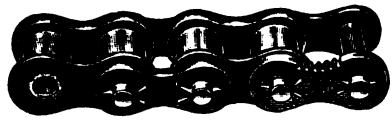
"WHITNEY" TRANSMISSION CHAINS:

The Flexibility of Belts
The Positive Connection of Gears



Silent Type

For machine tools, line shafts, factory drives, electric motors, cam shafts, magnetos, lighting systems, generators, pumps, self-starters, etc.



Roller Type

Used by the leading makers of motor trucks and rendering satisfactory service every day in the year.

SEE OUR ADS'TS IN MECHANICAL ENGINEERING THE JOURNAL OF THE A.S.M.E.

Our engineering department will be glad to assist you to secure maximum efficiency and service.

Digitized by Google

LANDIS MACHINE CO., INC.

WAYNESBORO, PA., U. S. A.

Manufacturers of Threading, Nut Tapping, Pipe and Nipple Threading and Pipe Threading and Cutting Machines; Automatic Die Heads and Chaser Grinder

THE LANDIS CHASER:

The design of the Landis chaser is entirely different from any other type of die and it embodies features which insure a high production of clean-cut, well-formed threads at a minimum cost of die maintenance.

Distinctive Features of the Landis Chaser

Its length is such as to give a life many times that of any other die. It has a variable rake angle which permits of a grinding suitable for the material being threaded. It has a line contact with the stock, thereby reducing the friction to a minimum and permitting of exceptionally high cutting speeds. The throat or bevel is permanent, insuring close shoulder work at all times. The chasers are interchangeable to the extent that any one or more of a set can be replaced without renewing the entire die. The chaser is milled and hardened its entire length, eliminating the necessity of annealing, hobbing and re-



SEE OUR ADVTS IN MECHANICAL ENGINEERING THE JOURNAL OF THE A.S.M.E.

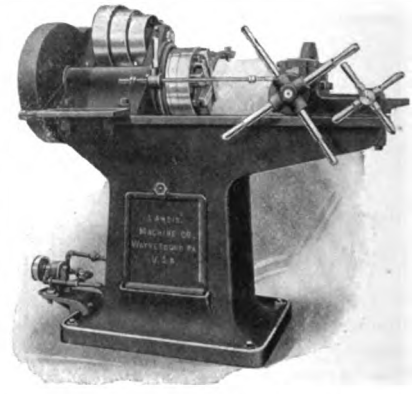
tempering. The chaser is sharpened by merely grinding it at the end. High speed steel can be used to better advantage than in any other type of die.

THE LANDIS DIE HEAD:

The die head is made entirely of steel. It has a diametrical adjusting mechanism which permits of a universal adjustment. The head is provided with an automatic opening and closing device which derives its action from the forward and backward travels of the carriage. This device is located within the head and carries all the cutting strain. It also serves to lock the head, relieving the yoke of this duty. The head is graduated both right and left hand for all sizes within its range.

THE LANDIS THREADING MACHINE:

The Landis Threading Machine is designed to give economical service and accurate results. The frame is cast in one piece. An excellent die lubricating system insures a sufficient flow of lubricant at all times. The carriage is gibbed to the bed to compensate for any wear. The vises have a horizontal sidewise, as well as a vertical centering adjustment, permitting a perfect and permanent alignment with the die. All gears are enclosed to provide for the safety of the operator.



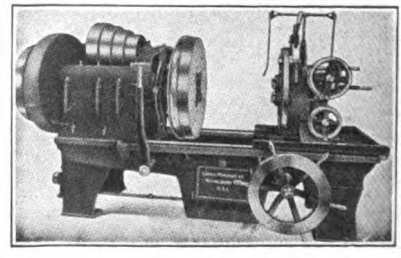
THE LANDIS PIPE AND NIPPLE THREADING MACHINE:

The Landis Pipe and Nipple Threading Machine is similar in design to the Landis Threading Machine. It is equipped with a reaming device which removes the burr which forms during the cutting-off operation, while the pipe is being threaded. Nipple grips are provided with both plain and threaded surfaces to receive the blank and threaded pipe ends.

THE LANDIS PIPE THREADING AND CUTTING MACHINE:

The Landis Pipe Threading and Cutting Machine employs a stationary type die head. The entire range of each head with the exception of the 2" size is covered by but *one set of chasers*. The head is manually operated and under working conditions is locked within itself.

The machine is rigid in construction and its design embodies all features to facilitate production and to insure safety for the operator. The carriage supports the head, cutting-off tools, reaming device, and length gauge, all located conveniently for efficient service.



Catalogue No. 24—Threading Machinery.
Catalogue No. 25—Pipe Threading Machinery.

Digitized by Google

LANDIS MACHINE CO., INC. WAYNESBORO, PA.

SPECIFICATIONS OF STANDARD THREADING MACHINES

Type	Size	Range	Chaser Equipment Inches	R. P. M. Countershaft Carbon Steel	R. P. M. Countershaft H. S. Steel	Floor Space Required	Approx. Net Weight Lbs.
Single Head Machines	½″	⅛″ to ½″	1 set each of ⅛, ¼, ⅜, ½ and ½.	180	300	1′ 9″x4′ 1″	850
	1″	¼″ to 1″	1 set each of ¼, ⅜, ½, ⅝, ¾, ⅞ & 1.	200	300	2′ 3″x4′11½″	1350
	1½″	⅛″ to 1½″	1 set each of ½, ⅝, ¾, ⅞, 1, 1⅛, 1¼, 1⅜ and 1½.	280	400	2′ 3″x4′11½″	1400
	2″	½″ to 2″	1 set each of ½, ⅝, ¾, ⅞, 1, 1⅛, 1¼, 1⅜, 1½, 1¾ and 2.	225	400	2′ 8″x7′ 1½″	2200
	2½″	¾″ to 2½″	1 set of ¾, ⅞, 1, 1⅛, 1¼, 1⅜, 1½, 1⅝, 1¾, 1⅞, 2, 2¼ and 2½.	300	600	2′ 8″x7′ 1½″	2300
	3″	1″ to 3″	1 set each of 1, 1⅛, 1¼, 1⅜, 1½, 1⅝, 1¾, 1⅞, 2, 2¼, 2½, 2¾ and 3.	300	500	3′ 7″x9′ 1″	4200
	4″	1½″ to 4″	1 set each of 1½, 1⅝, 1¾, 1⅞, 2, 2¼, 2½, 2¾, 3, 3¼, 3½, 3¾ and 4.	300	500	3′ 7″x9′ 1″	4550
Double Head Machines	½″	⅛″ to ½″	2 sets each of ⅛, ¼, ⅜, ½ and ½.	180	300	2′10½″x4′ 1″	1400
	1″	¼″ to 1″	2 sets each of ¼, ⅜, ½, ⅝ and ¾ and 1 set each of ⅞ and 1.	200	300	3′ 6″x4′11½″	2250
	1½″	⅛″ to 1½″	2 sets each of ½, ⅝, ¾, ⅞ and 1 and 1 set each of 1⅛, 1¼, 1⅜ and 1½.	280	400	3′ 6″x4′11½″	2400
	2″	½″ to 2″	2 sets each of ½, ⅝, ¾, ⅞, 1, 1⅛, 1¼, 1⅜ and 1½ and 1 set each of 1¾ & 2.	225	400	4′ ½″x6′ 4½″	3800
	2½″	¾″ to 2½″	2 sets each of ¾, ⅞, 1, 1⅛, 1¼, 1⅜, 1½, 1⅝, 1¾, 1⅞ and 2 and 1 set each of 2¼ and 2½.	300	500	4′ ½″x7′ 1½″	4050
	4″	1½″ to 4″	2 sets each of 1½, 1⅝, 1¾, 1⅞, 2, 2¼, 2½, 2¾ and 3 and 1 set each of 3¼, 3½, 3¾ and4″.	300	500	8′ 6″x7′ 0″	8200
Triple Head Machines	1″	¼″ to 1″	1 set each of ¼, ⅜, ½, ⅝, ¾, ⅞ and 1.	400	550	5′ 4½″x4′11½″	3350
	1½″	½″ to 1½″	1 set each of ½, ⅝, ¾, ⅞, 1, 1⅛, 1¼, 1⅜ and 1½.	250	360	5′ 4½″x4′11½″	3650
	2″	½″ to 2″	1 set each of ½, ⅝, ¾, ⅞, 1, 1⅛, 1¼, 1⅜, 1½, 1¾ and 2.	500	700	6′ 1½″x6′ 1″	5400

LONG BED THREADING MACHINES WITH LEADSCREW ATTACHMENTS

Sin. Head	1½″	½″ to 1½″	As desired	225	360	2′ 3″x7′ 3″	1450
	2½″	¾″ to 2½″	As desired	300	500	8′ 3½″x2′11″	3000
Dou. Head	1½″	½ to 1½″	As desired	225	360	3′ 6½″x7′ 3″	2650

SPECIFICATIONS OF STANDARD PIPE AND NIPPLE THREADING MACHINES

Type	Size	Range	Chaser Equipment	R. P. M. Countershaft Carbon Steel	R. P. M. Countershaft H. S. Steel	Floor Space Required	Approx. Net Weight Lbs.
Sin. Head Mach.	½″	⅛″ to ½″	1 set each 27, 18 and 14 Pitch.	180	300	1′ 9″x4′ 6″	850
	1¼″	⅛″ to 1¼″	1 set each 27, 18, 14, and 11½ Pitch.	300	425	2′ 3″x5′ 1″	1400
	2″	⅛″ to 2″	1 set each 18, 14 and 11½ Pitch.	225	400	2′ 8″x7′ 8″	2200
	4″	2½″ to 4″	1 set 8 Pitch.	300	500	3′ 7″x9′ 11″	4650
Dou. Head Mach.	½″	⅛″ to ½″	2 sets each 27, 18 and 14 Pitch.	180	300	2′10½″x4′ 6″	1400
	1¼″	⅛″ to 1¼″	2 sets each 27, 18, 14 and 11½ Pitch.	300	425	3′ 6″x5′ 1″	2300
	2″	⅛″ to 2″	2 sets each 18, 14 and 11½ Pitch.	225	400	4′ 0″x6′ 1″	3800
	4″	2½″ to 4″	2 sets 8 Pitch.	350	550	8′ 1″x6′10½″	7850

SPECIFICATIONS OF STANDARD PIPE THREADING AND CUTTING MACHINES

	2″	½″ to 2″	1 set each 14 and 11½ Pitch.	225	400	6′ 8″x3′ 2″	2650
	4″	1″ to 4″	1 set each 11½ and 8 Pitch.	300	500	9′ 10″x4′ 4″	6600
	6″	1″ to 6″	1 set each 11½ and 8 Pitch.	275	450	9′ 10″x4′ 4″	6600
	8″	2½″ to 8″	1 set each 8 Pitch and 8 Pitch.	225	400	9′ 10″x4′ 0″	10000

Digitized by Google

THE GEOMETRIC TOOL CO.

NEW HAVEN, CONN.

CHICAGO OFFICES: 627 W. Washington Blvd.

Manufacturers of Threading Machines and Tools for Cutting all Classes of Screw Threads

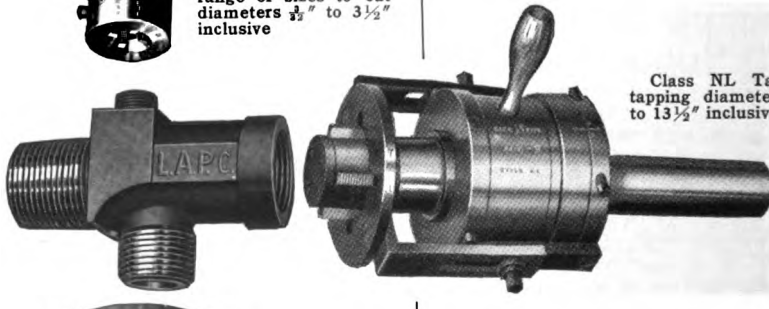
A quarter century of close study of Screw Cutting Tools by the originators, has developed a line of Thread Cutting Tools and Machinery that meets every requirement of work and machine.

The Geometric Self-Opening Adjustable Die Heads, Solid Adjustable Die Heads and Adjustable Collapsing Taps are made in a number of styles, each specially designed to meet the particular requirements.

Accurately hobbed Chasers of high speed steel, or carbon if preferred, specially hardened, are employed. There are four more of these Chasers, according to the diameter of the work.



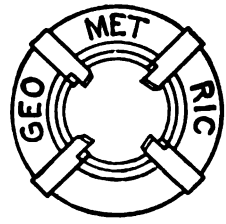
Style DD Die Head, for hand-operated turrets. Made in a range of sizes to cut diameters ½" to 3½" inclusive



Class NL Taps, for tapping diameters 1 ⅛" to 13½" inclusive



Style D Die Head, for cutting standard threads from ½" to 4½" diameter inclusive



Right in the Lead

Geometric Die Heads and Collapsing Taps are adapted for use on the turrets of practically all makes of hand and automatic screw machines and turret lathes.

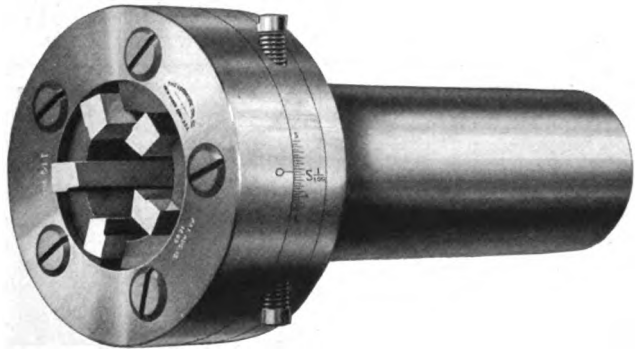
As the occasions for threaded parts have increased, The Geometric Tool Company has met each demand with a tool or machine particularly adapted to the requirements, no matter what the diameter, pitch or form of thread has been.

Threads can be cut flush to a shoulder where necessary. Chasers for cutting left hand threads can be furnished as readily as for right hand.

Given the thread specifications, The Geometric Tool Company can furnish the tools best fitted to give greatest production and accuracy.

Digitized by Google

THE GEOMETRIC TOOL CO. NEW HAVEN, CONN.



GEOMETRIC ADJUSTABLE HOLLOW MILLING TOOL:

These tools are built for the same efficiency in their range of action as all other Geometric tools.

The Geometric Adjustable Hollow Milling Tools are most effective and economical for reducing duplicate parts to an exact diameter prior to threading and for brass finishing. They are also used for cutting on cast iron, steel forgings, brass castings and other metals. Their use in place of the usual roughing and finishing box tools is quite desirable for general screw machine work where the cutting is not too heavy.

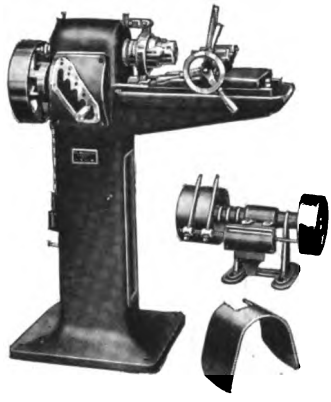
The Adjustable Hollow Milling Tools were designed to overcome the difficulties of their particular class of work. With the solid hollow mill, and the later spring finger hollow mill, when one of the cutters became broken, the entire tool had to be discarded and the expense of a new tool incurred. Simply renew the cutters in a Geometric Hollow Mill, and the Tool becomes as good as new.

The cutters are operated on cam adjustment. This adjustable feature gives a great range of diameters in each size of tool, and provides compensation for wear in the cutters. In closing the Hollow Milling Tool, all cutters of a set are universally adjusted, giving accuracy to tenths of thousandths. Taper milling can be accomplished as readily as straight milling by the use of the Geometric Adustable Hollow Milling Tool.

VARIETY OF WORK:

There is a vast amount of hollow milling that can be accomplished with much economy by the use of a Geometric Adjustable Hollow Milling Tool.

GEOMETRIC THREADING MACHINES:



These machines are employed on a large class of small threaded parts that cannot be produced economically on the ordinary screw machine. Made in three sizes—to cut ⅛ to ½ inch, ¼ to ¾ inch and ¾ to 1½ inch diameter threads.

DOUBLE SPINDLE THREADING MACHINE:

The ¾ inch Double Spindle Threading Machine is designed for threading work in which the threading time per piece is sufficient to allow the operator to chuck and start a second piece while the first is being completed. For this class of work the double spindle is a rapid producer. A number of threading combinations are possible with this machine. Both spindles may be fitted with Die Heads for external threading or with Taps for internal threading; or one spindle with a Die Head and the other with a Tap. For tapping sizes smaller than is practicable with a Collapsing Tap, we recommend fitting the machine with a Jarvis High Speed Tapping Device.

Digitized by Google

NELSON-BLANCK MFG. CO.

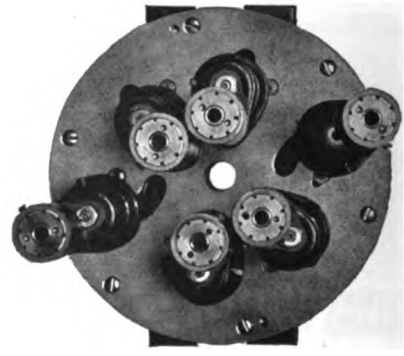
FACTORY AND MAIN OFFICE: 7744 DUBOIS ST., DETROIT, MICH.
EASTERN OFFICE: GRAND CENTRAL PALACE, NEW YORK, N. Y.

ADJUSTABLE DRILLHEADS:

TWO-SPINDLE adjustable heads are built in four sizes to take the following spindle equipment: Number 1-A Jacobs Chucks, Number 1, Number 2 and Number 3 Morse taper.

MULTIPLE SPINDLE heads for drilling holes equally spaced on a circle are built with 3, 4, 6 and 8 spindles.

Special Heads of all types and sizes built to order.



Specifications on Buhr Fully Adjustable All Spur Geared Ball Bearing Heads

No. of Head	No. of Spindles	Spindles Equipped with	Maximum Drill	Adjustment between Spindles	Minimum Dia. of Circle	Maximum Dia. of Circle	Height from Drill Press Spindle to Drill Spindle	Ratio of Speed—Drive Spindle to Drill Spindle Driver	Spindle
		Standard Equip.							
03-F.	3	No. 1-A Jacobs Chucks	1/4"	1 1/4"	1 1/2"	6 1/4"	11 3/8"	1 to 2.235	
03-F.S.	"	" " "	"	"	"	8"	"	" "	
04-F.	4	" " "	"	"	1 13/16"	6 1/4"	"	" "	
04-F.S.	"	" " "	"	"	"	8"	"	" "	
06-F.	6	" " "	"	"	2 1/2"	7 1/4"	"	" "	
06-F.S.	"	" " "	"	"	"	9 13/16"	"	" "	
08-F.	8	" " "	"	"	3 7/8"	9 1/4"	"	" "	
08-F.S.	"	" " "	"	"	"	11 13/16"	"	" "	
010-F.	10	No. 1-A Jacobs Chucks	1/4"	1 1/4"	5 13/16"	11 1/4"	11 3/8"	1 to 3.973	
010-F.S.	"	" " "	"	"	"	13 3/4"	"	" "	
012-F.	12	" " "	"	"	7 5/8"	13 1/4"	"	" "	
012-F.S.	"	" " "	"	"	"	16 7/8"	"	" "	
13-F.L.	3	No. 1 Morse Taper	13/32"	1 3/4"	2 1/8"	8 3/4"	13 13/16"	1 to 1.294	
13-F.M.	"	" " "	"	"	"	10 7/8"	"	" "	
13-F.	"	" " "	9/16"	2"	2 3/8"	8 3/4"	"	" "	
13-F.S.	"	" " "	"	"	"	10 7/8"	"	" "	
14-F.L.	4	" " "	13/32"	1 3/4"	2 1/2"	8 3/4"	"	" "	
14-F.M.	"	" " "	"	"	"	10 7/8"	"	" "	
14-F.	"	" " "	9/16"	2"	2 7/8"	8 3/4"	"	" "	
14-F.S.	"	" " "	"	"	"	10 7/8"	"	" "	
16-F.L.	6	" " "	13/32"	1 3/4"	3 5/8"	11 1/4"	"	" "	
16-F.M.	"	" " "	"	"	"	13 3/8"	"	" "	
16-F.	"	" " "	9/16"	2"	4"	11 3/4"	"	" "	
16-F.S.	"	" " "	"	"	"	13 3/8"	"	" "	
18-F.L.	8	No. 1 Morse Taper	13/32"	1 3/4"	5"	13 1/2"	13 13/16"	1 to 2	
18-F.M.	"	" " "	"	"	"	15 11/16"	"	" "	
18-F.	"	" " "	9/16"	2"	5 3/8"	13 1/2"	"	" "	
18-F.S.	"	" " "	"	"	"	15 11/16"	"	" "	
110-F.L.	10	" " "	13/32"	1 3/4"	7 1/2"	15 1/2"	"	" "	
110-F.M.	"	" " "	"	"	"	18 5/16"	"	" "	
110-F.	"	" " "	9/16"	2"	"	15 1/2"	"	" "	
110-F.S.	"	" " "	"	"	"	18 5/16"	"	" "	
112-F.L.	12	" " "	13/32"	1 3/4"	10 1/8"	19"	"	" "	
112-F.S.	"	" " "	"	"	"	20 13/16"	"	" "	
112-F.	"	" " "	9/16"	2"	"	19"	"	" "	
112-F.S.	"	" " "	"	"	"	20 13/16"	"	" "	
23-F.	3	No. 2 Morse Taper	29/32"	2 1/2"	3"	10"	15 9/16"	1 to 1.4	
23-F.S.	"	" " "	"	"	"	13 5/16"	"	" "	
24-F.	4	" " "	"	"	3 5/8"	10"	"	" "	
24-F.S.	"	" " "	"	"	"	13 5/16"	"	" "	
26-F.	6	" " "	"	"	5"	13"	"	" "	
26-F.S.	6	" " "	"	"	"	16 1/8"	"	" "	
34-F.	4	No. 3 Morse Taper	1 1/4"	3 1/8"	4 1/2"	12"	17 11/16"	1 to 1.133	
34-F.S.	"	" " "	"	"	"	18"	"	" "	

Digitized by Google

NELSON BLANCK MFG. CO. DETROIT, MICH.



Fixed Center Head

Special Adjustable Heads to Order



No. 02—2 Spindle Adjustable Head

Specifications on "BUHR" Adjustable Drill Heads

No.	No. of Spindles	Spindles Have	Min. Adj.	Max. Adj	Max. Drill	App. Hght. from Drill Press Spindle to Drilling Spindle	Ratio of Speed	App. Wt. without Adapter or Driver net lbs.	Weight of Adapter lbs.	Weight of Driver lbs.
02-SA	2	No. 1 Eclipse chucks or collets	1 between spindles	3 1/16	1/2	6	1–1 1/8	6 1/2	3 1/2–9	3/8–1 1/2
03-LS	3 in line	No. 1 Eclipse chucks or collets	3/4 between spindles	1 11/16	1/2	6	1–1 1/8 C. spin. 1–1	7 1/2	3 1/2–9	3/8–1 1/2
02	2	1-A Jacobs chucks or collets	1 1/4	4 3/4	1/4	6 1/2	1–1 1/8	7	3 1/2–9	1/2–1 1/2
03-L	3 in line	1-A Jacobs chucks or collets	1 between spindles	2 3/8	1/4	6 1/2	1–1 1/8 C. spin. 1–1	9	3 1/2–9	1/2–1 1/2
12	2	No. 1 M. T.	1 5/8	6	11/16	8 1/2	1–1 1/2	23	3 1/2–16	1–5
12-A	2	No. 1 M. T.	1 3/4	6	1/2	8 1/2	1–1 1/2	23	3 1/2–16	1–5
13-L	3 in line equi-distant	No. 1 M. T.	1 1/4 between spindles	3	1/2	8 1/2	1–1 1/2 C. spin. 1–1	25	3 1/2–16	1–5
13	3 in circle equi-distant	No. 1 M. T.	2 1/8	6 1/16	1/2	8 7/8	1–1 1/8	28	3 1/2–16	1–5
14	4 as above	No. 1 M. T.	2 5/8	7 3/8	1/2	8 7/8	1–1 3/8	45	3 1/2–16	1 1/2–5
16	6 as above	No. 1 M. T.	4 1/8	8 11/16	1/2	8 7/8	1–1 1/2	81	6–16	2–6
18	8 as above	No. 1 M. T.	6	10 3/4	1/2	8 7/8	1–2	106	6–16	2–8
22	2	No. 2 M. T.	2 3/8	7 1/2	7/8	9 1/4	1–1 1/4	37	6–35	2–6
23-L	3 in line equi-distant	No. 2 M. T.	1 3/4 between spindles	3 3/4	7/8	9 5/8	1–1 1/4 C. spin. 1–1	41	6–16	2–6
24	4 in circle equi-distant	No. 2 M. T.	3 3/4	9 3/4	7/8	9 5/8	1–1 1/4	90	9–35	2 1/2–8
32	2	No. 3 M. T.	2 7/8	11 1/4	1 1/4	12 1/4	1–1 1/4	86	9–39	2 1/2–8
33-L	3 in line equi-distant	No. 3 M. T.	2 1/8	5 5/8	1 1/4	12 1/4	1–1 1/4 C. spin. 1–1	90	9–39	2 1/2–8

Adjustable heads not listed—built to order. Center spindles furnished with all adjustable heads. No 1-A Jacobs drill chucks standard equipment in No. 02 and No. 03-L heads. Other makes if specified. When heads are equipped with drill chucks, minimum adjustment is controlled by diameter chuck body.

Digitized by Google

THE CLEVELAND TWIST DRILL CO.

Established 1874

NEW YORK CITY
30 Reade Street

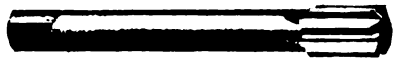
CLEVELAND, OHIO

CHICAGO
9 No. Jefferson St.

Catalog No. 319 Describes All

DRILLS **MILLS**
REAMERS **MANDRELS**
SOCKETS **ARBORS**
COUNTERBORES
SCREW EXTRACTORS
HIGH SPEED TOOLS

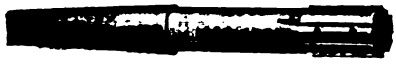
"PEERLESS" High Speed REAMERS (Patented):



have blades of high-speed steel united with the soft steel body by a patented process which produces a solid, one-piece reamer of unusual toughness, at an appreciable saving in manufacturing cost. This patented method of manufacture links in a single tool the toughness of a carbon reamer with the unique producing capacity typical of only the high speed tool. "Peerless" High Speed Reamers are especially recommended for machine reaming and are furnished in all styles, *including expansion.*

502

"PARADOX" ADJUSTABLE REAMERS (Patented):



combine many of the advantages of both solid and adjustable types. The body is of machinery steel, case-hardened where subject to wear, into which are inserted blades of tool steel. Taper-headed screws wedge these blades firmly against their backing, the blades being counter-sunk at intervals along the shoulder at their base to fit the taper screw-heads.

One of the screws is placed near the end of the blade, giving firm support where most needed, and preventing the tool from "hogging in." This construction gives all the rigidity of a solid reamer.

"PERFECT DOUBLE-TANG" SOCKETS (Patented):



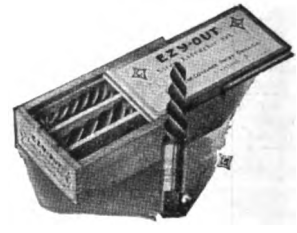
have two driving slots instead of the usual one and afford a simple means of restoring old tools with broken tangs to their original usefulness. They "nest" and will fit any spindle or socket having a regular taper hole.

"PARAGON" DRILLS:



are not flat bars twisted while hot, but are twist drills *forged* from the original bar of high-speed steel in special dies. This method produces correctly shaped flutes and toughens the metal. Especially designed for heavy duty drilling. They may be adapted to Morse standard tapers by means of special sleeves.

"EZY-OUT" SCREW EXTRACTORS: (Patented):



The only tool designed for the express purpose of removing broken set and cap screws, studs, pipe-fittings, etc. Made in 12 sizes. A valuable adjunct to every shop. Entirely eliminates the necessity of retapping and makes the removal of a broken screw a matter of a few moments only.



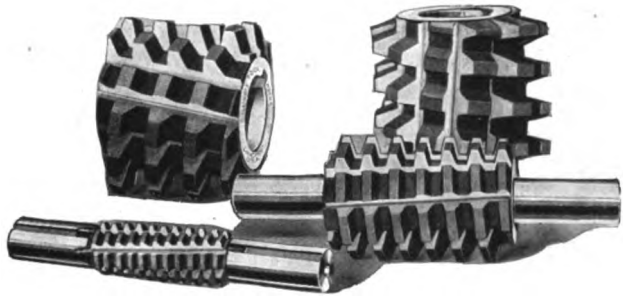
All styles and sizes of Milled Drills High Speed or Carbon.

Digitized by Google

ILLINOIS TOOL WORKS

154 East Erie St., CHICAGO, ILL.

Manufacturers and Designers of Cutters, Hobs, Reamers



ILLINOIS HOBS:

Ground and Unground are manufactured for all standard makes of Hobbing Machines. Made of High Speed Steel unless otherwise specified.

It is not our ambition to make *all* the hobs used in industry; only to make the *best.*

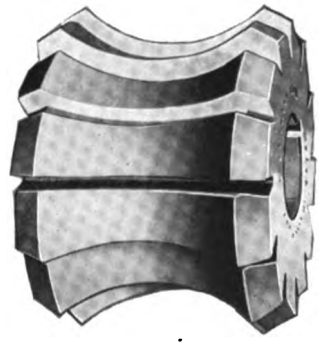


ILLINOIS HOBS are thoroughly inspected after each operation during manufacture, also before shipping. The inspection facilities for testing these hobs include machines and tools especially designed to detect any possible imperfections.

HOBBING PROBLEMS, submitted to the Illinois Tool Works, are solved by experts. You are invited to avail yourself of their knowledge.

Illinois Tools Accurate—Dependable

Our engineering department offers a constructive service to plants with production problems, in the designing of tools to meet special requirements.



ILLINOIS TOOLS extend beyond the limits of utility and the restrictions of service; they are the expression of an industrial ideal. Every user of high speed tools should have our Catalog B.

When ordering Formed Cutters send drawing or sample of work.

Illinois Tool Works, Chicago, U. S. A.

Digitized by Google

THE NATIONAL TOOL CO.

CLEVELAND, OHIO

Manufacturers of Milling Cutters and Special Tools

CHICAGO OFFICE AND STOCK
26 South Jefferson St.

NEW YORK SALES OFFICE
50 Church St.

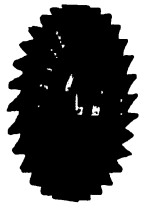
ATLANTA SALES OFFICE
34 So. Forsyth St.

PHILADELPHIA OFFICE AND STOCK
1215 Filbert St.

PITTSBURGH OFFICE, 988 UNION ARCADE

DETROIT OFFICE & STOCK, 610–611 Sun Bldg.

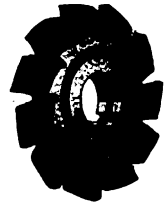
NATIONAL CLEVELAND MILLING CUTTERS are widely known for their serviceability and economy. The line is complete, being increased to include new tools whenever the need is recognized. The following list covers the types in general demand and are usually carried in stock. We are fully equipped for the manufacture of any special types of cutters or similar tools in large quantities. Send drawings or complete specifications for prices.

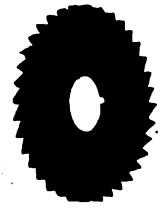


Angular Cutters
  Double
  For Spiral Mills
Concave Cutters with Form Teeth
Concave Cutters
Corner Rounding Cutters
Convex Cutters with Formed Teeth
Convex Cutters with Milling Cutter Teeth
Counterbores
Cutters for Making Twist Drills
Cutters for Grooving Straight Lipped Twist Drills
Cutters for Making Four Lipped Twist Drills
Cutters for Fluting Reamers
Cutters for Grooving Taps
Cutters for Grooving Taps and Reamers



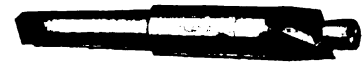
End Mills—
  Taper Shank Shell
  Keyway Straight Shank
Gear Cutters—Involute
  Bevel or Mitre Metric
Hobs—
  Spur or Spiral Gear & Worm Wheel
Hollow Mills—
  Adjustable Solid
Inserted Tooth Cutters—
  Face Milling Cutters
  Side Milling Cutters
Keyway Cutters—
  Woodruff
Metal Slitting Saws
Milling Cutters—
  Nicked Tooth
  Plain Milling
  Side Milling
  Interlocking Side Milling





Sprocket Cutters—
  For Block Center Chains
  For Roller Chains
Stocking Cutters for roughing gear teeth
Tee Slot Cutters
Thread Cutters, single and multiple styles

THE NATIONAL-CLEVELAND INTERCHANGEABLE COUNTERBORE AND SPOT FACER:



Both types of cutters and all parts are interchangeable.

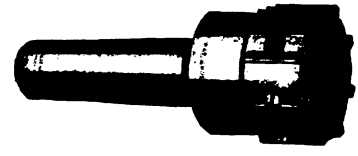
Holders are made of the very best material.

Cutters of High Speed Steel.

Pilots of Tool Steel hardened and ground.

The hole for the Pilot in both the Cutter and Holder is ground to insure a good fit for the Pilot Shank. The Pilot is held in place by a Set Screw. The Cutter is screwed on the Holder and does not depend upon the Pilot for drive.

THE NATIONAL-CLEVELAND ADJUSTABLE CYLINDER REAMER:



For the Proper Finishing of Engine, or Similar Cylinders without Grinding:

We have designed a special line of reamers for the proper sizing and finishing of engine cylinders and without grinding, the required glass smooth finish can be obtained.

We recommend as a complete outfit two roughers and one floating finisher. The construction of the roughers is the same as the finishers, except the floating action is not required. We are prepared to make up these reamers for any size cylinder from 2¼" in diameter up and with shanks or special arrangements for driving to fit various types of drill presses, boring mills, etc.

Digitized by Google

GEO. F. MARCHANT CO.

1420–1428 SOUTH ROCKWELL ST., CHICAGO, ILL.

Manufacturers of Steel Plate and Structural Workers Tools

"New Process" Punches and Dies:



Are well known for their high quality and economy in use. Are made from a high grade of tool steel made especially for us. Furnished in two tempers "Standard" for light or soft stock and "Special" marked "H" for hard punching.

Vanadium Air Hammer Rivet Sets:



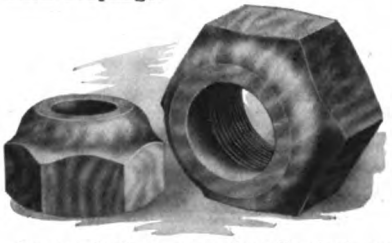
Made from the highest grade Vanadium Alloy Steel, with shanks and fillets ground to size after hardening; accuracy assured in size and maximum service.

"Marco-Vanadium" Chisel Blanks:



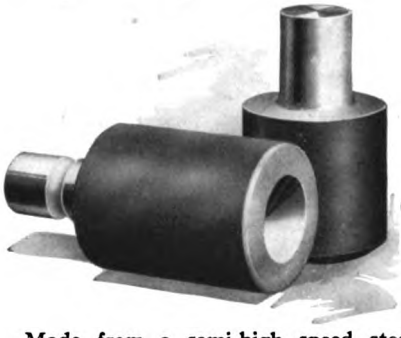
Chipping efficiency is measured by the quality of steel in the tools. Ours are made from the highest grade Vanadium Alloy Steel and outlast carbon steel chisels five to one.

Punch Couplings:



Are made from open hearth steel, case hardened and have ample wrench surface.

"Heatproof" Compression Riveter Dies:



Made from a semi-high speed steel. Their temper is not affected by hot rivets and can be used continuously without cooling. Cost a little more and last five to ten times as long as common dies.

"New Process" Shear Blades, Rivet Machine, Gripping and Heading Dies:



These are furnished in two grades. One made of low carbon tool steel, the other made of semi-high speed steel. Shear blades for hot work are made from a special steel.

Special tools made to order.

Send drawings and specifications for prices.

Digitized by Google

E. C. ATKINS & CO., INC.

Established 1857

HOME OFFICE AND FACTORY

INDIANAPOLIS, IND.

CANADIAN FACTORY, Hamilton, Ont. MACHINE KNIFE FACTORY, Lancaster, N. Y.

Makers of Saws and Tools

Branches carrying complete stocks in all large distributing centers, as follows:

Atlanta	Minneapolis	Portland, Ore.	Vancouver, B. C.
Chicago	New Orleans	San Francisco	Sydney, N. S. W.
Memphis	New York City	Seattle	Paris, France

ATKINS "KWIK-KUT" METAL CUTTING MACHINES:

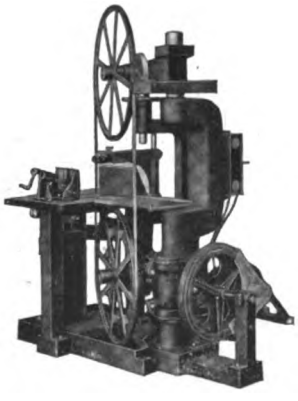


Automatically regulate the stroke, using practically the entire toothed edge of the blade in cutting.

"Kwik-Kut" machines contain many other distinctive Atkins features that reduce expense and increase production. The machine illustrated is furnished either motor- or belt-driven suitable for cutting stock up to 8".

505

METAL BAND SAW MACHINE:

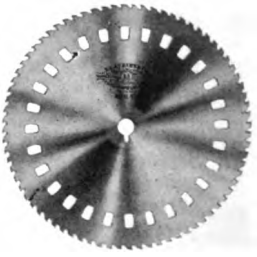


Atkins No. 3 Metal Band Saw Machine is an example of the most modern and improved type of machine for metal cutting.

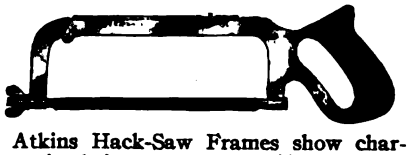
This machine has many exclusive and distinctive features all of which are explained in our literature. Write for it.

METAL CUTTING SAWS:

Atkins Circular Metal Cutting Saws are manufactured from steel specially formulated to withstand the rigors of severe service. Advanced methods of manufacture and an exclusive tempering process afford opportunities to get the best possible blades for Higley, Lea-Simplex, Q & C, Bryant, and in fact any machine on the market.



HACK-SAW FRAMES:



Atkins Hack-Saw Frames show character in their construction. Their perfect balance makes them easy to operate and reduces the possibility of blade twists and breaks.

Atkins Frames are made in several different styles suitable for all kinds of work.

ATKINS "AAA" NON-BREAKABLE HAND AND POWER HACK-SAW BLADES:



Atkins Non-Breakable Hack-Saw Blades are made with the usual hard edge, but with a soft back that prevents breakage.

The edge is tempered so as to insure a cutting capacity superior to "all hard" blades. These blades will cut faster and hold their cutting edge longer than the "all hard" blades, and the liability to break or snap off is entirely eliminated. A necessity in out-of-the-way spots for shop use where inexperienced help is employed.

Makers of all kinds of Saws, Saw Tools and Machine Knives.

Descriptive literature sent on request.

Digitized by Google

SIMONDS MANUFACTURING CO.

FITCHBURG, MASS.

CHICAGO, ILL.
NEW ORLEANS, LA.
NEW YORK CITY
SEATTLE, WASH.
LOCKPORT, N. Y.
MEMPHIS, TENN.
SAN FRANCISCO, CAL.
PORTLAND, ORE.
MONTREAL, QUE.
VANCOUVER, B. C.
ST. JOHN, N. B.
LONDON, ENGLAND

Manufacturers of Saws, Knives, Files, Steel



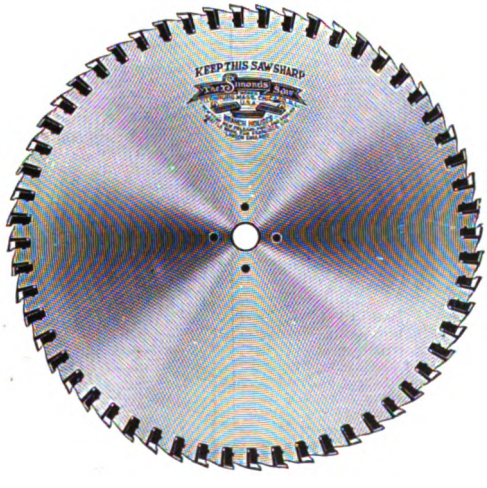
SIMONDS METAL CUTTING SAWS:

We make Metal Cutting Saws, Slitting Saws and Screw Slotters for any make of machines. Simonds Hack Saw Blades, hand or power, and Simonds Files are carried in stock by the Hardware Dealers in your city.

When ordering Simonds Metal Cutting Saws please specify: Diameter, Thickness, Hole, Pin Holes, Material to be cut, Number of Teeth, Solid or Inserted, Make of Saw, Make of Machine.

SEE OUR ADVT. IN MECHANICAL ENGINEERING THE JOURNAL OF THE A.S.M.E.







Digitized by Google

THE L. S. STARRETT COMPANY

ATHOL, MASSACHUSETTS

NEW YORK STORE
90–92 West Broadway

LONDON WAREHOUSE
36 and 37 Upper Thames St., E. C.

CHICAGO STORE
17 No. Jefferson St.

Manufacturers of Fine Mechanical Tools

STARRETT TOOLS:

Of all the different kinds and sizes of tools which comprise the Starrett line, there is not one but was added to fill a specific need of men who work metal to precision measurements. Utility, accuracy and a uniform quality characterize every Starret Tool.

Calipers
- Pocket Slide
- Vernier

Center Tester, Punches
Clamps
- Key-Seat
- Measuring Bar
- Parallel, Rule, Steel

Countersinks
Dividers
Draftsmen's Tools
Drill Blocks
Gages
- Bench, Button, Cal.
- Center, Circum.
- Depth, Vernier
- Drill, Tap, Wire
- Fillet or Radius
- Height, Vernier
- Hub, Inside Caliper
- Inspectors
- Micrometer Caliper
- Micrometer Depth
- Planer and Shaper
- Scratch, Sc. Pitch, Sole
- Stair, Surface, Taper
- Telescoping
- Thickness

Ground Flat Stock
Hack Saws and Frames
Inclinometers
Jack Screws
Leveling Instruments and Levels
Loco'tive Guide Liner
Micrometers, In., Out.
Nail Sets, Pin Vises
Pliers
Plumb Bobs
Protractors
- Bevel, Draftsmen's
- Patent, Univ. Bevel

End Measuring Rods
Rules
- Folding, Shrink, Slide

Scrapers
Combination Sets
Sets of Tools
Speed Indicators
Squares
- Caliper, Carpenters', Center
- Combination, Die Makers'
- Double, D'ftmen's T
- Graduated Hardened
- Hardened Edge
- Micrometer Caliper
- Try, Special Std.
- Thin Steel

Straight Edges
Steel Tapes
Test Indicators
Trammels
Transits

MICROMETER CALIPERS:



Made in all sizes from ½ inch to 12 inches and graduated in both metric and English systems. Furnished with or without standards and with or without lock nut and ratchet stop as desired. All measuring surfaces and bearing parts are hardened. Smaller sizes may be had to measure in ten-thousandths of an inch. Leather cases may be had for any size up to 6 inches, or they may be had in sets with or without velvet-lined morocco leather case. The Starrett line includes standard size micrometer calipers, heavy, screw-thread, hub, paper gage, U. S. Gov't, bench and inside micrometer calipers, micrometer caliper heads and special purpose micrometers and attachments. Catalog of tools sent to any address on request.

STARRETT HACK SAWS:

Are made of the finest grade of tungsten steel, found after exhaustive experiments to be best adapted to the purpose.

The teeth are sharp, with square cutting points, set evenly and in such a manner that every tooth cuts. The set is just enough to insure a free, smooth, and rapid cut, removing no more stock than necessary. The saws are tempered by our improved process, which leaves them hard and tough, so that they will not "shell off," and are uniform in temper. They are too hard to file. All saws are hardened throughout, except the flexible back saws. Every saw is guaranteed to be of the best quality and adapted to most economically meet the requirements of the class of work for which it was designed.

The Starrett system of selecting saw blades according to the physical and chemical characteristics of the substances to be cut, is founded on the results of experiments conducted by engineers and tests made in our own shops, and its economy of time, material and blades has been proven repeatedly. The Starrett recommendation is not for a multiplicity of blades, but rather for the wise selection of a comparatively small number of saws, each of which will cut a wide range of materials most economically.

SEE OUR ADVTS. IN MECHANICAL ENGINEERING THE JOURNAL OF THE A.S.M.E.

STARRETT HACK-SAW CHART:

MATERIAL TO BE CUT	No. of Blade for Hand Frame		No. of Blade for Power Machine			
	All Hard	Flexible or Soft Back	Light Machine	Medium Machine	Heavy Machine	Extra Heavy Machine
Light Angles, Channels, Tee Iron, Ornamental	102	252	115	262		
Heavy Angles, Channels, Tee Iron	103, 112	250	115-B	255		
Light Structural	112-B	250-B	115-B	255	254	256
Heavy Structural	112-B	250-B	114	255-B	254-B	256-B
Rail Cutting	112-B		114	255-C	254-C	256-C
Steel and Iron Pipe, Conduit and Brass Pipe	102	252	115	262	259	
Solid Stock, Cold Rolled, Machine Steel	103-B, 112-B	250, 250-B	114	255-B, 255-C	254-B, 254-C	256-B, 256-C
Tool Steel, Cast Iron	103, 112		114	255	254	256
Brass	103, 112		115	262	259	
Sheet Metal and Tubing, Less than 18 gage	253	258				
Sheet Metal and Tubing, Over 18 gage	102	252				

Numbers above are those given in the Starrett General Catalog and on boxes containing the blades

Digitized by Google

VICTOR SAW WORKS, INC.

SPRINGFIELD, MASS.

Manufacturers of Hack Saw Blades



VICTOR HACK SAW BLADES:

Are made from Victor Special Private Formula Steel, a semi-high speed alloy of extreme toughness. Every blade is carefully milled, not punched, and is scientifically hardened, not surface burnt. The teeth are set by our Victor patented shear set. Every tooth a perfect cutting tool.

To get 100% efficiency care should be taken in selecting the right blade, and there is a Victor blade for every purpose. This does not mean a confusing number of blades for we have carefully worked out by experiment and test the best blade for each kind of work.

Regular stock blades always furnished when length only is specified.

The superiority of Victor Hack Saw Blades is due to their being a quality product throughout. The highest quality of materials, up-to-date methods of manufacture and rigid inspection—all along the line—combine to make Victor quality.

HAND—ALL HARD No. 1

Size	Regular Stock Blade For General All-Round Work	Soft Steel	Tool Steel	Brass	Thin Tubing	List Price
			Hard Metals	Copper	Electric Casing	
		Cast Iron		Drill Rod	Iron Pipe	
			Light Angle Iron	Sheet Metals	Thin Sheet Metals	
	Teeth per Inch				Fine	Per Gross
8" × ½ × 0.025	18	18	18	24	..	8.00
9" × ½ × 0.025	18	18	18	24	..	9.00
10" × ½ × 0.025	18	14	18	24	..	10.00
× ½ × 0.025		..		24	..	12.00
12" × ½ × 0.025	18	14	18	..	..	12.00
× ½ × 0.028	14	14	18	..	..	12.60
14" × ½ × 0.028	14	14	18		..	16.20

HAND—FLEXIBLE No. 2

8" × ½ × 0.025	18	18	18	24	32	8.00
9" × ½ × 0.025	18	18	18	24	32	9.00
10" × ½ × 0.025	18	14	18	24	32	10.00
× ½ × 0.025	...	..	..	24	32	12.00
12" × ½ × 0.025	18	14	18	..	..	12.00
14" × ½ × 0.028	14	14	18		..	16.20

HAND SPECIAL
For Hard High Carbon Rails

Length.....12 inches
Price, Special AA, No. 1, 14 and 18 Teeth per gross, $12.00

All lengths given for hand blades measure from center to center of holes.

MACHINE—ALL HARD No. 4
For Light Power Machine Work

Size	Regular Stock Blade For General All-Round Work	Steel Rails Annealed Tool Steel	Light Angle Iron Iron Pipe	Heavy High Speed Machines Run with Cutting Solution		List Price
		Heavy Angle Iron Soft Steel	Brass Copper	Machine Steel	Tool Steel Light Angle Iron	
		Cast Iron Bronze	Tool Steel Hard Metals	Heavy Angle Iron Large Work	Steel Rails Small Work	
	Teeth per Inch					Per Gross
10" × ¾ × .062	14	14	18	..	..	18.60
12" × ¾ × .065	..	14	..	..	..	14.40
12" × ¾ × .032	14	14	18	..	..	16.80
14" × ¾ × .065	14	14	18	..	..	18.90

MACHINE—ALL HARD No. 4
For Heavy Power Machine Work

10" × ¾ × .049	10	10	14	..	..	18.85
× ¾ × .065	10	10	14	..	..	20.40
12" × 1 × .049	10	10	14	..	..	22.60
× 1¼ × .049	..	..	..	6	8	27.00
× ¾ × .049	10	10	14	.	..	27.30
14" × 1 × .049	10	10	14	8	10	34.30
× 1¼ × .049	..	..	..	6	8	44.10
16" × 1 × .049	10	10	14	.	..	39.20
× 1 × .065	10	10	14	.	..	41.60
17" × 1¼ × .049	..	..	..	6	8	53.55
× 1 × .065	10	10	..	8	10	53.55
× 1½ × .065	..	..	..	6	8	66.90
18" × 1 × .049	10	10	10	.	..	44.10
× 1¼ × .049	..	..	..	6	8	60.70
× 1 × .065	10	10	10	.	..	60.70
20" × 1 × .065	10	10	10	.	..	62.00
× 1½ × .049	..	..	..	6	8	99.90
24" × 1 × .065	10	10	..	.	..	75.00
× 1¼ × .065	..	..	..	6	8	120.00

Lengths of No. 4 power blades measure from center to center of holes, excepting 14 and 17 inch lengths; these measure 13½ and 16½ inches. When length only is specified, we will furnish power blades in all lengths up to and including 14 inches, .032 inch thick. Longer lengths up to 24 inches, .049 inch thick; 24 inches and longer, .065 inch thick.

Digitized by Google

NORTON COMPANY

WORCESTER, MASS., U. S. A.

NEW YORK STORE	DETROIT STORE	CHICAGO STORE
151 Chambers St.	233 West Congress St.	11 N. Jefferson St.
Electric Furnace Plants	**Bauxite Plant**	**Manufacturing Plant**
NIAGARA FALLS, N. Y.—CHIPPAWA, CAN.	BAUXITE, ARK.	WORCESTER, MASS.

Manufacturers of Alundum and Crystolon Grinding Wheels, Alundum and Crystolon Grain for Polishing, Alundum Refractories and Laboratory Ware, Glass Cutting Wheels, Sharpening Stones, Scythe Stones, Rubbing Bricks and Stones, Grinding Wheel Dressers and Grinding Machinery

Alundum

TRADE MARK

(Al_2O_3) is an artificial abrasive, the hardness, sharpness and toughness of which are under control during manufacture. This, in combination with its characteristic conchoidal fracture, makes Alundum Grinding Wheels particularly effective upon materials of high tensile strength—notably steel and its alloys.

Crystolon

TRADE MARK

(SiC) is another product of the electric furnace and because of its wonderful purity and remarkable cutting qualities, combined with its greater brittleness, this abrasive has proved highly efficient in grinding cast iron, brass, bronze, aluminum, glass, marble, pearl and materials of like physical characteristics.

NORTON GRINDING WHEELS:

Are made by four processes—the vitrified, silicate, elastic and rubber. In the vitrified process, the principal bonding ingredient is clay; in the silicate, sodium silicate is largely used; in the elastic process, the bond is made from a special mixture of shellac and other ingredients; while in the rubber process, a special form of vulcanized rubber is utilized.

Wheels can be furnished in various shapes and sizes to meet grinding requirements. Sizes run from as small as $\frac{1}{16}$" diameter to as large as 60" diameter, while the thinnest wheels made are $\frac{1}{32}$" thick, and the widest faced 28" thick. All wheels larger in diameter than 5" are subjected to a severe mechanical test before shipment to bring out any inherent weakness.

Wheels are classified by grain and grade, the grain numbers indicating the size of the abrasive cutting particles, and the grade denoting the measure of strength of the bond, or binding material in the wheel which holds the grain in its setting.

GRAIN FOR POLISHING:

Alundum and Crystolon grain are used extensively for polishing many kinds of material. Alundum grain is particularly efficient on steel and other metals of high tensile strength.

REFRACTORIES:

Owing to the high refractory properties possessed by Alundum this substance has been found unequalled for the manufacture of refractory and laboratory ware. Alundum is made into electric furnace cores, tubes, muffles, crucibles, combustion boats, filtering crucibles, cones, extraction thimbles and refractory cements.

SPECIAL RESEARCH SERVICE:

We have well-equipped research laboratories with a competent staff of research engineers and demonstrators who are always ready to give you the benefit of their special knowledge and wide experience in the solving of your special problems.

Any of these Booklets will be sent upon request:

Grinding Wheel Catalog
Alundum-Crystolon Grinding Wheels
Polishing—What to Use—How to Use It
Norton Refractories—Alundum and Crystolon
Saw Sharpening
The Grinding of High Speed Steel
Tool Grinding
Grinding Wheel Dressers
Bushing Grinding Wheels
Cam Grinding and Cam Grinding Equipment
A Treatise on Dynamic Balance
Principles of Cylindrical Grinding
Storage, Handling and Supervision of Grinding Wheels
How To Order Grinding Wheels
Balancing of Grinding Wheels
Commercial Diamonds
Grinding Wheels on the Blanchard Surface Grinding Machine
Grinding Wheels on the Pratt & Whitney Surface Grinding Machine
Snagging
Balancing Equipment for Grinding Wheels
Steadyrests—Form Grinding—Grinding of Plane Surfaces
Universal Tool and Cutter Grinding Machines

(See page 489 for additional products of this Company)

Digitized by Google

THE STERLING GRINDING WHEEL COMPANY

TIFFIN, OHIO, U. S. A.

CHICAGO HOUSE
30–32 N. Clinton Street

NEW YORK
The L. Best Co., 28–30 W. Broadway
Selling Agents

Manufacturers of Grinding Wheels and Grinding Machines

A Grinding Wheel For Every Purpose

Sterlith
For Steel

Sterbon
For Cast Iron

Sterlith

Sterbon (SiC)

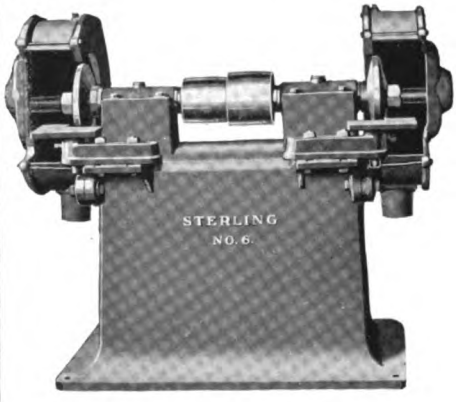
Vitrified **Silicate** **Elastic**

Sterling Wheels are made by three processes, vitrified, silicate and elastic. The vitrified is the usual bonding in clay. The silicate are made with sodium silicate as the base and can be relied upon for accuracy and balance. The elastic bond is made up of shellac and other ingredients to make a true resilient wheel.

Sterling can be furnished in any shape or face, standard shapes such as straight, cup, cylinder, saucer, being carried in stock in a large variety of sizes. They are made up to 60 inches in diameter and 10 inches thick. There is a Sterling Wheel for every make of grinding machine.

STERLING GRINDING MACHINES:

Made in Bench, Floor, Swing Frame and Wet Tool types in a range of sizes ample to take care of all classes of work.



511

All Sterling machines are generously designed and carefully constructed to stand up under heavy production requirements without permanent strain or undue wear. To this end the bearings are long, accurate fitting, self-oiling and dust proof. The materials used are consistent with the duty imposed and the workmanship is so controlled as to provide an accurate and rigid machine.

Whether your problem is new equipment or unsatisfactory results from present methods our experience and services are at your command. Write to us.

Digitized by Google

THE HOGGSON & PETTIS MFG. CO.

NEW HAVEN, CONN., U. S. A.

Manufacturers of Lathe Chucks, Special Tools and Machinery, Rubber Mfr's Supplies, Roll Engraving, Etc., Cutting Dies, Steel Stamps

THE SWEETLAND INDEPENDENT CHUCKS:

PRICE LIST, DIMENSIONS, ETC.

Code	Size In.	Size of Hole Inches	Diameter of Recess for Face Plate, In.	Weight Lbs.	Price
fable	4½	1	4⅛	7	$20.00
fabric	6	1½	5⅝	12	22.00
facade	8	1¾	4¾	28	26.00
facile	9	1¾	5⅝	32	28.00
facet	10	2 1/16	5⅝	42	30.00
faction	12	3	6 11/16	67	35.00
faculty	14	3	6 11/16	84	40.00
fagot	16	3	7 13/16	117	46.00
faith	18	4	9½	157	54.00
falcon	20	4⅛	9½	184	62.00
fame	22	5	11	217	70.00
fancy	24	5	11	267	80.00
jashion	26	5	12	315	93.00
fastness	28	5	13	360	110.00
fargon	30	6	15	430	130.00





512



DIMENSIONS
OF ALL
GEARED SCROLL CHUCKS
Numbers 6, 60, 61, 62, 63, 64, 65 and 6

Size	Net Weight Approx. 1 Set Jaws		Gross Weight Approx. 1 Set Jaws		Net Weight Jaws Per Set		Size of Hole	Diameter of Recess for Face Plate	Will Hold	Diameter of Swing
	3 Jaws	4 Jaws	3 Jaws	4 Jaws	3 Jaws	4 Jaws				
3	.....	.....	3½	4	.....	.....	⅝	2⅛	3¼	3¾
4	7¼	7¾	7½	7½	¾	1	1	3	4⅜	4¾
5	10½	11	11	11½	1½	1¾	1¼	3⅛	5½	5½
6	16½	16¾	17¼	17½	1¾	3	1⅞	4¾	6¾	6⅞
7½	26	28½	29	31½	3	4	2	4¾	8½	8⅝
9	38	40	41	46½	3½	5½	2½	5	10½	10
10½	53	53½	61	61½	5½	7½	3	5⅜	11½	11½
12	69	73½	81	85	8	11½	3½	6⅛	13	12½
15	114	117	128	131	8	12	3½	6⅛	16	15⅞

COMMON **Jaws are Styles Nos. 61 and 62**
REVERSE **Jaws are Styles Nos. 63 and 64**
REVERSIBLE **Jaws are Styles Nos. 6 and 60**

Three Jaw Chucks Styles Nos. 61, 63			Four Jaw Chucks Styles Nos. 62, 64		
Code	Size	Price	Code	Size	Price
inhale	3 in.	$17.00	inland	3 in.	$19.00
inlet	4 in.	19.00	inmate	4 in.	21.00
install	5 in.	21.00	inmost	5 in.	23.00
issue	6 in.	24.00	indorse	6 in.	27.00
inward	7½ in.	27.00	induce	7½ in.	30.00
inveigh	9 in.	33.00	indulge	9 in.	36.00
insect	10½ in.	38.00	incense	10½ in.	42.00
insight	12 in.	45.00	india	12 in.	50.00
insipid	15 in.	60.00	indigo	15 in.	65.00

TWO SETS OF JAWS ARE STYLES No. 65 and 60

Three Jaw Chucks Style No. 65			Four Jaw Chucks Style No. 66		
Code	Size	Price	Code	Size	Price
inject	3 in.	$20.00	incase	3 in.	$22.00
insist	4 in.	22.00	inboard	4 in.	24.00
instep	5 in.	24.00	incage	5 in.	27.00
iris	6 in.	28.00	incise	6 in.	31.00
invest	7½ in.	32.00	inclose	7½ in.	36.00
inverse	9 in.	38.00	incline	9 in.	42.00
intrude	10½ in.	44.00	incrust	10½ in.	49.00
inform	12 in.	52.00	incur	12 in.	58.00
inflict	15 in.	70.00	incurvate	15 in	76.00

Digitized by Google

THE HOGGSON & PETTIS MFG. CO. NEW HAVEN, CONN.

THE SWEETLAND COMBINATION LATHE CHUCKS:



WITH REVERSIBLE JAWS

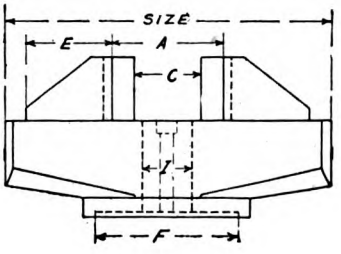


WITH COMMON JAWS

SWEETLAND BOX BODY CHUCK:



Can Be Furnished as Universal or Independent. Slip Jaws, Tool or Soft Steel



Front Elevation Box Body Chucks

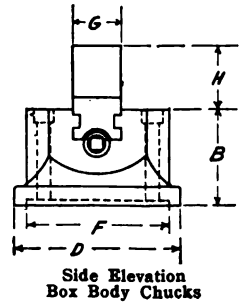
These Chucks Can Be Furnished from Stock with Three or Four Jaws as Desired

BOX BODY CHUCKS

Size	Weight each	A	B	C	D	E	F	G	H	I	Code	Price
In.		In.	In.	In.	In.	In.	In.	In.	In.	In.		
7	20 lbs.	3	3	1½	4½	2	3 11/16	1¾	1¾	1¾	eared	$28.00
9½	38 lbs.	4	3¼	2¼	5 5/16	2¾	4 5/16	2	2¼	2	Earl	33.00
12	50 lbs.	6	3¾	4	6	3	5	2¼	2¾	2¼	earth	40.00
15	75 lbs.	8	4½	6	7¾	3½	6 11/16	2¼	3	2¼	easel	50.00
18	100 lbs.	10	4½	8	7¾	4	6 11/16	2¼	3½	2¼	Eaves	75.00

COMBINATION LATHE CHUCKS

Size	Net Wt. Approx.		Gross Wt. Approx.		Diameter of Swing	Will Hold	Size	Diameter of Recess for Face Plate	Price Lists	
	3 Jaw	4 Jaw	3 Jaw	4 Jaw					Three Jaw	Four Jaw
In.	Lbs.	Lbs.	Lbs.	Lbs.	In.	In.	In.	In.		
6	20	21	23	24	8	6½	1¼	3 1/16	$35.00	$42.00
9	33	36	41	44	10½	9½	1½	5	45.00	54.00
9	60	65	73	78	13¾	12¼	1¾	5 7/16	56.00	66.00
15	80	84	94	98	16¼	15¼	1¾	5 7/16	70.00	82.00
18	110	116	129	135	19	18½	2	9	87.00	102.00
21	125	147	148	168	22¾	21½	2¼	9	110.00	130.00
24	145	162	170	187	25¾	24½	2½	9	136.00	160.00
30	332	383	379	430	32	30½	4½	12 1/16	200.00	240.00
36	465	529	484	540	38½	36½	4½	12 1/16	264.00	325.00
42	610	640	675	700	44½	42½	4½	24	360.00	450.00



Side Elevation Box Body Chucks

(Continued on next page)

Digitized by Google

(Continued from preceding pages)

THE HOGGSON & PETTIS MFG. CO. NEW HAVEN, CONN.

HAND CUT STEEL LETTERS AND FIGURES:



The proper grade of steel is used in the construction of these hand cut steel figures and letters. A size suitable for the letter to go on it is used and is long enough so it can be held without hitting the fingers.

Size, Inch	Price Figures, per set	Price Letters, per set	Price Letters or Figures, each
1–64	$8.00	$24.00	$1.00
1–32	5.00	15.00	.70
1–24	4.50	13.50	.60
1–20	4.50	13.50	.60
1–16	3.50	10.50	.50
1–12	3.50	10.50	.50
3–32	3.50	10.50	.50
1–10	3.50	10.50	.50
1–8	3.50	10.50	.50
5–32	4.00	12.00	.60
3–16	4.50	13.50	.60
7–32	5.00	15.00	.70
1–4	5.50	16.50	.70
5–16	6.50	19.50	.80
3–8	8.00	24.00	.90
7–16	9.00	27.00	1.10
1–2	11.00	33.00	1.30
5–8	15.00	45.00	1.70
3–4	19.50	58.50	2.30
7–8	25.00	75.00	3.20
1	31.50	94.50	3.60

HAND CUT STEEL STAMPS:



Of all kinds and for all purposes. The work is all strictly hand cut, the letters being correctly shaped and the stamps properly tempered to suit the work they are to do. Price list is for plain letter hand stamps only.

Size, Inch	Price per Letter	Size, Inch	Price per Letter
1/32	.70	1/4	.70
1/24	.60	5/16	.80
1/20	.60	3/8	.90
1/16	.50	7/16	1.10
1/12	.50	1/2	1.30
3/32	.50	5/8	1.70
1/10	.50	3/4	2.30
1/8	.50	7/8	3.20
5/32	.60	1	3.60
3/16	.60		

Stamps with letters over 1/8 inch will be charged extra at the rate of 100 cents per pound for steel and forging.

MARKING ROLLS AND MACHINE STAMPS:



Estimates cheerfully given for machine stamps and marking rolls, completing or for cutting same only. Also for fancy lettering and special designs; stamps for difficult places and shapes.

Digitized by Google

STANDARD SHOP EQUIPMENT CO.

23RD ST. AND HUNTING PARK AVE.
PHILADELPHIA, PENNA., U. S. A.

Manufacturers of Set-Up Appliances for Machine Tools

CAD BOLT

Will not break out machine table slots



Cannot turn in machine table

Pat. Oct. 22, 1918

The CAD bolt is a standard machine table bolt ready-for-use

In every machine shop—bolts, nuts, clamps, etc., are used every minute in the day. The kind now in use lack something—care in the making.

Much time is wasted by productive labor using improvised bolts and clamps, that are even more costly than CAD Equipment can be purchased.

CAD Bolts are made in sizes to fit your "T" slots without machining.

They are interchangeable from one machine to another.

Will not ruin machine table slots or break out sections of the table.

In special machinery having "T" slots, the CAD Bolt will be found an economical component part in place of the square head steel bolt turned from bar stock.

The selected steel, the quality of the threads and uniformity of its head have been approved by leading superintendents and manufacturers in varied lines.

Price per Hundred Bolts without Nuts

Adopted November 6, 1916

Length under head	DIAMETER ½ HEAD ⅞ sq. x ⅛	⅝ HEAD 1 1/16 sq. x 5/16	¾ HEAD 1 3/16 sq. x ⅜
2½	$12.00	$18.00	$26.00
3	13.00	19.00	28.00
3½	14.00	20.00	30.00
4	15.00	22.00	32.00
4½	16.00	23.00	33.00
5	16.50	24.00	35.00
5½	17.00	25.00	37.00
6	18.00	26.00	38.00
7	20.00	28.00	42.00
8	21.00	30.00	45.00
9	22.50	33.00	48.00
10	24.00	35.00	52.00
12	27.00	40.00	58.00

CAD Bolts are made in ⅜″ to 1″ sizes in lengths up to 30″. Carried in stock.

CAD WASHERS EXTRA THICK COLD ROLLED STEEL

Size	O.D.	Thick	Price
⅜	⅞	⅛	.05
½	1	5/32	.06
⅝	1¼	¼	.07
¾	1½	¼	.08
⅞	1¾	¼	.09



CAD NUTS FINISHED CASE HARDENED EXTRA THICK

Cat. No.	Size	Price
3UN	⅜–16	.08
4UN	½–13	.10
5UN	⅝–11	.16
6UN	¾–10	.22
7UN	⅞–9	.27



CAD Standardized set-up appliances

Standard Tool Room and Machine Shop Clamp

Cat. No.	L'gth	Price
3DC	3″	.30
4DC	4″	.40
6DC	6″	.50
7DC	7″	.75
9DC	9″	1.00
12DC	12″	2.50

CAD DOUBLE END CLAMP



The Handiest Clamp Ever Used in a Shop

Cat. No.	L'gth	Price
2SC	2″	.25
3SC	3″	.30
3½SC	3½″	.40
4½SC	4½″	.50
5½SC	5½″	1.00

CAD SINGLE END CLAMP



A Universal Packing Block for Tool Room and Machine Shop

Cat. No.	Size	Price
3PB	3x2	.25
4PB	4x2½	.40
6PB	6x3½	.75

CAD PACKING BLOCK

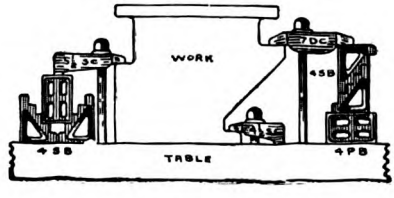


Cad Step Block

Cat. No.	Size	Price
4SB	4x3	.50
6SB	6x4	1.00
8SB	8x6	2.00
9SB	9x3	2.00
12SB	12x4	4.00
18SB	18x4	6.00
24SB	24x4	8.00



PRACTICAL APPLICATION



Write for Catalogue A3.

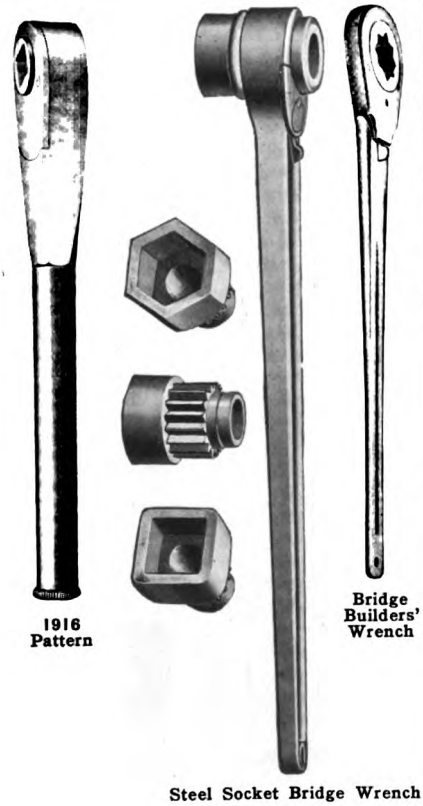
It is full of valuable information.

Digitized by Google

LOWELL WRENCH CO.

54 COMMERCIAL ST., WORCESTER, MASS.

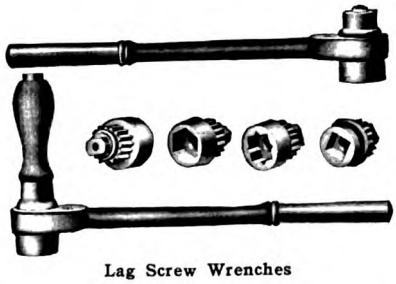
Manufacturers of Reversible Ratchet Wrenches, Drills and Die Stocks, Hand and Jewelers Pin Vises



1916 Pattern

Bridge Builders' Wrench

Steel Socket Bridge Wrench



Lag Screw Wrenches

LOWELL WRENCHES:

These tools are time savers and carried in stock in sizes mentioned below. Special Ratchet Wrenches built to order.

1916 Pattern, Right or Left Hand:

Made in sizes from 7″ to 24″ handle for ¼″ to 1½″ square or ⅝″ to 1 13/16″ hexagonal.

Bridge Builders Wrench:

Made in weights of 11, 14 and 23 lbs. with 3 foot handle to take a 1″ to 2½″ square or 1 1/16″ to 3⅛″ hexagonal.

Steel Socket Bridge Wrench:

Made in sizes from 2 foot handle weighing 10 lbs. to 4 foot handle weighing 54 lbs., to take squares from 1″ to 5″ or to take hexagonal from 1″ to 5″.

Lag Screw Wrenches:

Made in sizes from 12″ to 20″ handle to take a square from ⅜″ to 1 13/16″ or a hexagonal from 11/16″ to 1 13/16″.

No. 12345 Wrench:

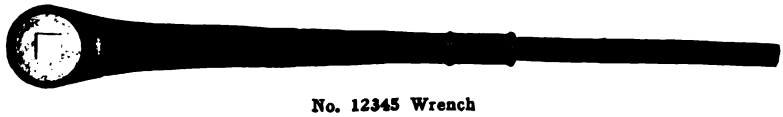
Made in sizes from 4 foot to 6 foot handle with from 1½″ to 2½″ square opening in gears.

We also make:

Socket Ratchet Wrench Sets in sizes from ¼″ to 1¼″ Bolt.

Drilling posts and service Ratchets to take taper shanks from 11/16″ to 2″.

Improved Hand Vises for watchmakers.



No. 12345 Wrench

Digitized by Google

J. H. WILLIAMS & CO.

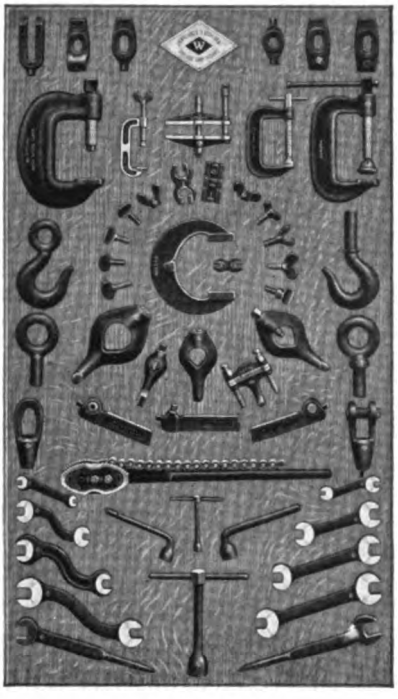
BROOKLYN
70 Richards St.

BUFFALO
70 Vulcan St.
St. Catharines, Ont., Canada

CHICAGO
1070 W. 120th St.

Manufacturers of Drop-Forgings and Drop-Forged Tools

WILLIAMS' SUPERIOR DROP-FORGINGS AND DROP-FORGED TOOLS:



Stock Forgings

STANDARD STOCK LINES:

of "Vulcan" and "W" and "Agrippa" and "W&B" and "Falcon" Brands of Tools and Forgings, including

Drop-Forged Wrenches:

in about 1000 Sizes in 40 Patterns with openings $\frac{1}{16}$" to 7⅝". Monkey Wrenches, "Bull Dog" Wrenches, etc.

Tool Holders:

for the economical use of High Speed Steel in Turning, Planing, Boring, Threading, Knurling, Cutting-off, Side Work, etc.

Lathe Dogs:

the "Safety" kind—Capacities ⅜ to 6 inches.
Bent and Straight Tail—One or Two Screws.

"C" Clamps:

Four Patterns—for Heavy, Medium, Light Service and Tool Makers.

Strap Clamps:

6 patterns, 3 to 4 sizes each, to replace old, clumsy hand-made affairs for clamping work on Planer, Lathe, Drill-press, etc.

Chain Pipe Wrenches and Vises:

"Falcon" and "Vulcan" with "proof-tested" Flat Link or Cable Chain.

Eye Bolts:

Plain and Shoulder Patterns—¼ to 2½" diameter Shanks—Blank or Threaded. Heat-treated and "proof-tested."

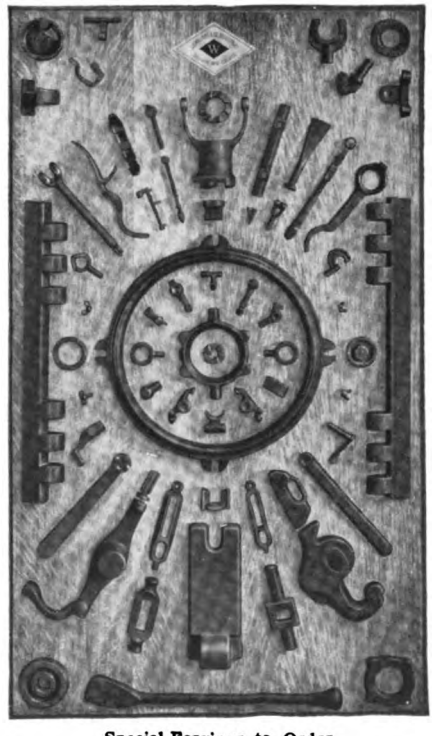
Hoist Hooks:

Shank and Eye Patterns, heat-treated and "proof-tested," for ½ to 25 tons Safe Working Load.

SPECIAL FORGINGS:

Small or large, to order for "Quality" work—Airplane and Automobile Crankshafts, Connecting Rods, etc., from straight carbon and alloy steels. Our Forge Equipment includes machines with falling weights running from 300 lbs. Board to 12,000 lbs. Steam Drop-hammers.

Ask for Pocket Catalog.



Special Forgings to Order

Digitized by Google

AUTOMATIC PRODUCTS CORP'N

Successor to

TOCK SCREW MACHINE PRODUCTS CORPORATION

199-203 EIGHTH STREET, LONG ISLAND CITY, N. Y.

Manufacturers of Screw Machine Products

AUTOMATIC SCREW MACHINE PRODUCTS:

A complete modern plant, equipped with Brown & Sharpe, Acme & Gridley Machines for the rapid production of automatic screw machine parts.

Small accurate parts our specialty—all metals, including

Steel,

Brass,

Copper,

Bronze,

Aluminum,

German Silver.

Capacity:

From $\frac{1}{64}$" up to 2¼".

Deliveries:

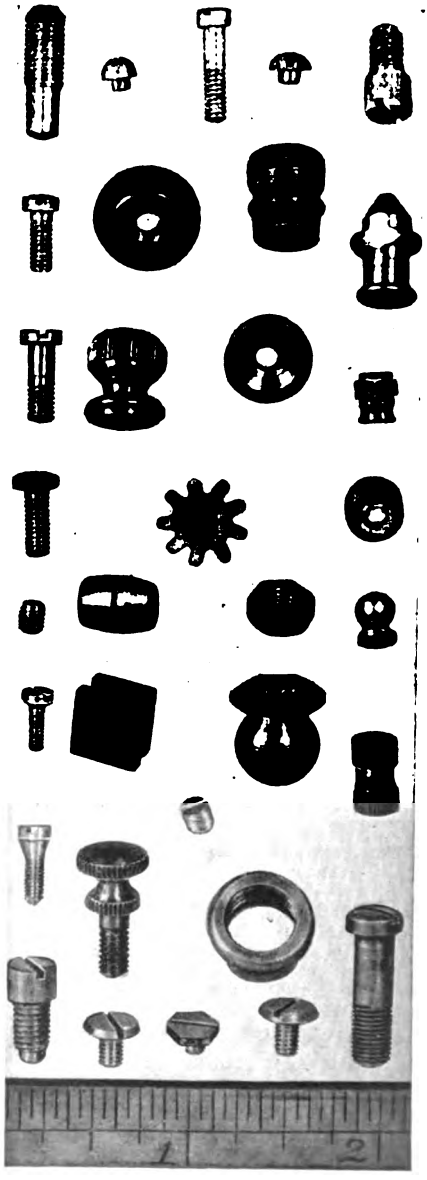
Prompt.

Production:

Unlimited.

Send us your Blue Prints or samples. Estimates will be cheerfully and promptly furnished.

Parts that we have Manufactured:



Digitized by Google

THE WALLACE BARNES COMPANY

MAIN OFFICE AND WORKS
BRISTOL, CONN.
WESTERN OFFICE: Book Bldg., DETROIT, MICH.

Flat and Wire Springs of every Type

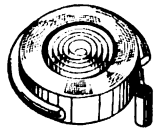
Special Screw Machine Products **Cold Rolled Spring Steel**

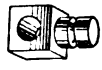
Simply tell us how your spring is Used—We'll do the rest.

We have the equipment for making hundreds of thousands of parts, for practically every type of mechanical device. Here's a summary of "Barnes-Made" Products:

If you use a brush-holder spring 

or one of the round  type we make them. Spiral springs, straight  or coned.  Flat springs  of any description  or size.

Torsion  springs, phonograph or clock  springs, all of these we make to your specifications from the better grades of material, whether flat high carbon steel, tempered round wire, music wire, brass, phosphor bronze or steel alloys.

And because we assemble so many springs with screw machine parts, we make these too—special  screws, knurled  pieces, or any precision  part.

At best this can only give an impression of our facilities. Our Catalog contains some interesting information about Springs. Let our Engineering Department work with you in designing Springs best suited to your product. No machine too intricate, no spring problem too difficult for our skilled engineers. Their knowledge is based upon the 64-years' spring-manufacturing experience of the Wallace Barnes Company.

519

Digitized by Google

AMERICAN SCREW COMPANY

PROVIDENCE, RHODE ISLAND

Makers of Wood Screws, Machine Screws, Stove Bolts, and Tire Bolts

WOOD SCREWS:

Flat, Round, and Oval Head Wood Screws are made in Iron and Brass, from ¼″ to 6″ in length, and from No. 0 to No. 30 (screw gauge)



Flat Head



Round Head



Oval Head

in diameter. The length measurement includes the whole of the head of flat heads, the countersink of oval heads, and about half the head of round heads.

DRIVE SCREWS:

Drive Screws are used by being driven in with a hammer, like nails, but they have greater holding power and can be withdrawn with an



ordinary screw driver. They are made in Iron, flat head only, from ½″ to 3½″ in length, and from No. 4 to No. 20 (screw gauge) in diameter.

SCREW GAUGE IN DECIMALS OF AN INCH

No. In.	No. In.	No. In.	No. In.	No. In.
0 .058	5 .124	10 .189	15 .255	22 .347
1 .071	6 .137	11 .203	16 .268	24 .374
2 .084	7 .150	12 .216	17 .282	26 .400
3 .097	8 .163	13 .229	18 .295	28 .426
4 .111	9 .176	14 .242	20 .321	30 .453

TIRE BOLTS:



Plain

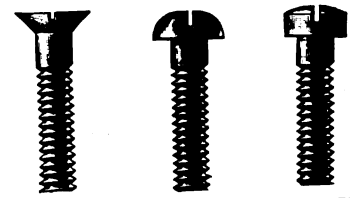


Fluted

Tire Bolts are made in Iron from ⅛″ to ⅜″ in diameter, from 1″ to 6″ in length, and in two brands. "Bay State" bolts are furnished either plain or fluted, and following trade custom are somewhat smaller in diameter than "Eagle Philadelphia" bolts of the same nominal diameter. "Eagle Philadelphia" bolts are furnished plain only. The length measurement includes the head.

MACHINE SCREWS:

Flat, Round, and Fillister Head Machine Screws are made in Iron and Brass from ⅛″ to 4″ in length, and from No. 2 to No. 34 (screw gauge) in diameter. The length measurement

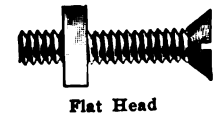


Flat Head Round Head Fillister Head

includes the whole of the head of flat heads, and excludes the whole of the head of round and fillister heads.

STOVE BOLTS:

Though known in the trade as Stove Bolts, these bolts, made from bright iron wire, are in general use for all purposes requiring small plain bolts.



Flat Head



Round Head

Flat and Round Head are made from ⅛″ to ½″ in diameter, and from ⅛″ to 6½″ in length. The length measurement includes the head of flat heads, and excludes the head of round heads.

STOVE RODS:

Stove Rods are the same as Stove Bolts in every respect excepting length. They are made in Iron of 5/16″ and ¼″ diameter, and from 7″ to 40″ in length. The length measurement includes the head of flat heads, and excludes the head of round heads.

This company is the longest established (1838) and the largest maker of the articles here shown, and it carries a large stock, ready for immediate delivery, comprising, in addition to the varieties commonly in demand, a large assortment of varieties less frequently called for and often difficult to obtain elsewhere.

Price Lists, showing the exact range of sizes as well as the prices, will be sent on application.

Digitized by Google

THE CHAMPION RIVET COMPANY

Established 1895

CLEVELAND, OHIO

WESTERN PLANT, EAST CHICAGO, IND.

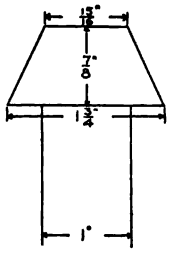
Manufacturers of Boiler, Ship, Structural and Tank Rivets

VICTOR STEEL RIVETS:

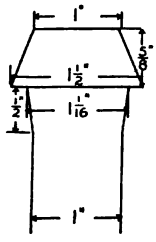
Rivets, though seemingly unimportant, are the most important units entering into the construction of any steel structure.

Upon their quality and the method of driving them, life and property depend.

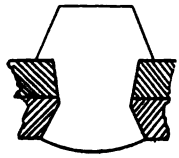
Mechanical Engineers and Marine Architects specify them freely.



CONE HEAD
STRAIGHT NECK

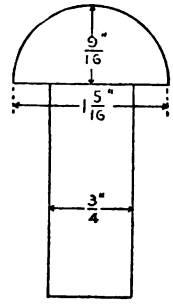


PAN HEAD
SWELL NECK



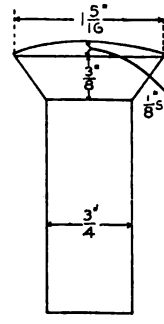
PAN HEAD
SWELL NECK
WHEN DRIVEN

The few specimens illustrating this page are not descriptive of our whole line. We manufacture all styles.



BUTTON HEAD

We manufacture all sizes of rivets—from ¼ of an inch in diameter up.



OVAL
COUNTERSUNK

Our rivets conform to Standard specifications such as:

A. S. M. E. Code.
American Society for Testing Materials.
American Bureau of Shipping.
U. S. Navy Specifications.
Lloyd's Register of Shipping.

Full data and record of tests furnished on application.

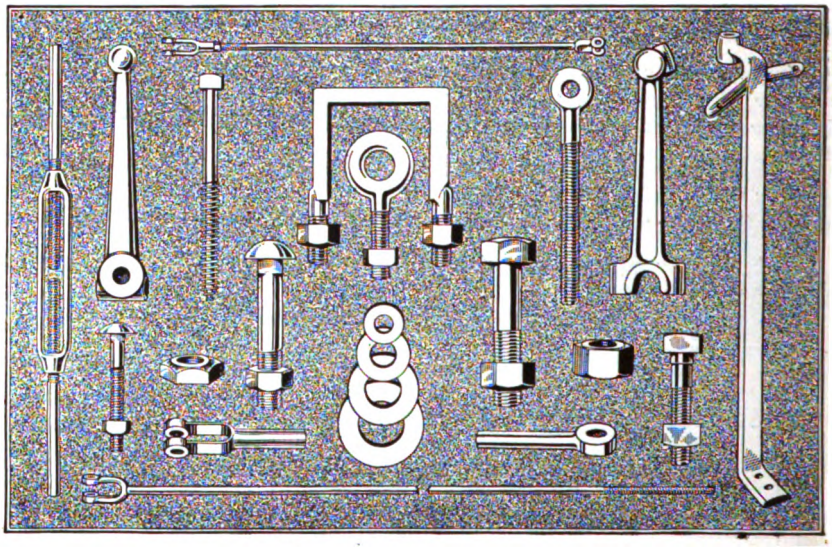
We publish one of the most interesting booklets on this subject. It is entitled SCIENTIFIC FACTS, and is yours for the asking. You will find it contains more information on this seemingly simple subject than has ever been written.

Digitized by Google

THE COLUMBUS BOLT WORKS CO.

COLUMBUS, OHIO

Bolts, Nuts, Rivets and Special Forgings



Over 40 years' experience in manufacturing these lines insures best quality.

Bind Quality with Quality

Our Bolts, Nuts, Carriage Hardware and Automobile Forgings are upholding the reputation of many products.

Blank Bolts
Common Carriage Bolts
Eagle Carriage Bolts
Fancy Head Carriage Bolts
Eye Bolts
Fender Bolts
Hook Bolts
Machine Bolts
Nutted Staples
Plow Bolts
Spring Bolts
Step Bolts
Tire Bolts
Coach and Lag Bolts
Nuts: Hexagon, square and special—
Hot pressed, forged, cold punched, chamfered, trimmed and reamed
Washers: Round, Wrought Iron
Yoke Ends
Rod Ends for Yokes
Yoke and Rod End Assemblies
Turn-Buckles
Cold drawn Rods
Carriage Forgings
Axle Clips
King Bolts
Shaft Couplings
Drop Forgings to blueprint

Write for Catalog E.

Send blueprints with quantity wanted for prices on Special Forgings.

Digitized by Google

DRAKE LOCK-NUT CO.

EAST 75TH AND STANTON AVE., CLEVELAND, OHIO

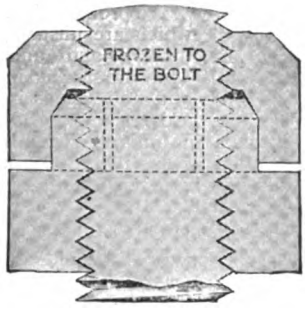
PACIFIC COAST PLANT
SAN FRANCISCO, CAL.

Manufacturers of Drake Lock-Nuts

DRAKE LOCK-NUTS
"NEVER AND LOOSE"
TRADE MARK REGISTERED U. S. PAT. OFF.

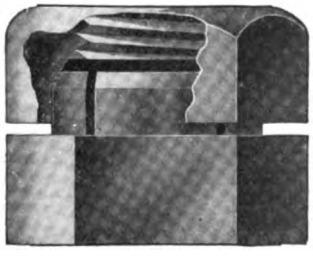
The flexible finger members of the lower or nut member are compressed inward toward center of bolt with tremendous force by screwing down the upper or locking member, thus freezing the nut to the bolt, which, when released, will move the same as any ordinary nut and do absolutely no harm to either thread.

Bolt and nut can be used over and over again without any harm to the threads.



No washer is needed.

To apply. The prime member pulls up the work to exact adjustment required; a micrometer adjustment is obtained; then apply locking member with firm turn up.



Members do not meet on horizontal line. Contact is only on annular bevels; thus the load is not lifted off prime member.

Write for samples.

Only standard hexagons throughout. Any regular wrench can be used.

The movement of the slotted members is centering radial only and not circumferential, when being locked, which would wear the threads.

Note the abundance of threads in the lower or nut member, which gives a tremendous load-carrying capacity and strength to pull up the work.

Time saved in Application Pays Entire Cost.

PRICE LIST IN ORIGINAL BOXES

Bolt Size	Standard Hexagons	U. S. F. Threads Per Inch	Total Height of Nut	Ship'g Wt in Lbs. per 100 Nuts	Boxed	Hex. Steel Spec. Screw Stock Per 100
1/4	S. A. E.	28	25/64	2½	100	4.00
	U. S. S.	20	31/64	3	100	4.50
5/16	S. A. E.	24	15/32	3	100	4.50
	U. S. S.	18	37/64	4½	100	5.00
3/8	S. A. E.	24	33/64	3½	100	5.00
	U. S. S.	16	41/64	7	100	6.50
7/16	A.L.A.M.	20	5/8	5½	100	6.50
	U. S. S.	14	23/32	9½	100	7.50
1/2	S. A. E.	20	11/16	7	100	8.00
	U. S. S.	13	13/16	12	100	9.00
9/16	S. A. E.	18	51/64	10½	100	10.00
	U. S. S.	12	59/64	15	100	11.00
5/8	S. A. E.	18	55/64	14	50	12.00
	U. S. S.	11	1 1/64	24	50	13.00
3/4	A.L.A.M.	16	1 5/64	22	50	16.00
	U. S. S.	10	1 15/64	34	50	17.00
7/8	S. A. E.	14	1 15/64	30	50	21.00
	U. S. S.	9	1 23/64	45	50	24.00
1"	S. A. E.	14	1 25/64	45	50	32.00
	U. S. S.	8	1 35/64	70	50	35.00
1 1/8	U. S. S.	7	1 3/4	98	50	48.00
1 1/4	U. S. S.	7	1 29/32	128	50	66.00
1 3/8	U. S. S.	6	2 1/16	185	20	98.00
1 1/2	U. S. S.	6	2 3/16	220	20	138.00
1 5/8	U. S. S.	5½	2 3/8	280	20	186.00
1 3/4	U. S. S.	5	2 5/16	330	20	260.00
2"	U. S. S.	4½	2 3/16	450	20	430.00

3" U. S. S. to order.

DISCOUNTS ON APPLICATION. PRICES SUBJECT TO CHANGE WITHOUT NOTICE

Digitized by Google

REED & PRINCE MFG. CO.

WORCESTER, MASS.

WESTERN OFFICE: CHICAGO, ILL.

Manufacturers of Screws, Rivets, Bolts and Nuts for Every Purpose

Products that *give satisfaction*

The quality of our product is the result of experience, the quality of our service is the result of progress.

In perfecting our product we have eliminated the unnecessary features and concentrated our efforts on the improvement of features hitherto neglected, but of primary importance.



WOOD SCREWS:

We manufacture the highest grade of Wood Screws in Steel, Brass and Bronze. Our stock includes Flat, Round and Oval Heads from ¼" to 6" long and from size 0 to 30 inclusive. Special sizes and heads can be had, if desired.

MACHINE SCREWS:



Machine Screws made by the Reed & Prince Mfg. Co. are known all over the Country for their quality and accuracy. The latest threading process is used in their manufacture. They are made in both Steel and Brass in A. S. M. E. Standard sizes and threads. Special sizes, styles, and materials are supplied on order.

NUTS:

Standard and special Nuts can be furnished in a large number of sizes and shapes. Our Patented Pressed Steel Wing Nuts are used on finished products of all classes.

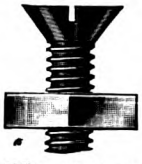


CAP AND SET SCREWS:



Our Cap Screws are the result of practical experience and ceaseless research. Improved methods and machinery are used entirely in the manufacture of these Screws. Listed sizes up to ¾" in diameter are made in Hex. Fillister, Flat, and Button Heads.

Set Screws are supplied with standard square heads in either Cup or Oval Points. These Screws are carefully hardened by the best accepted process.



BOLTS:

We produce Stove Bolts which are unsurpassed in quality and uniformity. They are stocked in Round and Flat Heads in standard sizes. Bolts for different uses in unlimited number are manufactured at our plant. Further information will be given upon request.

RIVETS AND BURRS:



The superior quality of our Rivets makes them the choice for every possible use everywhere. Specially designed machinery and carefully trained workmen is the secret. These goods are supplied in Standard Heads and sizes, made from Basic Steel, the most satisfactory material for Rivets.

Uniformity and accuracy are characteristic of the Burrs we make. These are supplied in Bright or Plated Finish.

SPECIAL PRODUCTS:

The facilities which we have for manufacturing special products enable us to give our customers unusual service along this line, especially because of our long and varied experience with this class of work.

FINISHES:

Our ability to produce Nickel, Brass, Copper, Bronze, Silver, Oxidized, Tinned and Galvanized Electro-Plated finishes is unsurpassed. Hot Tinning and Galvanizing can be had when required.

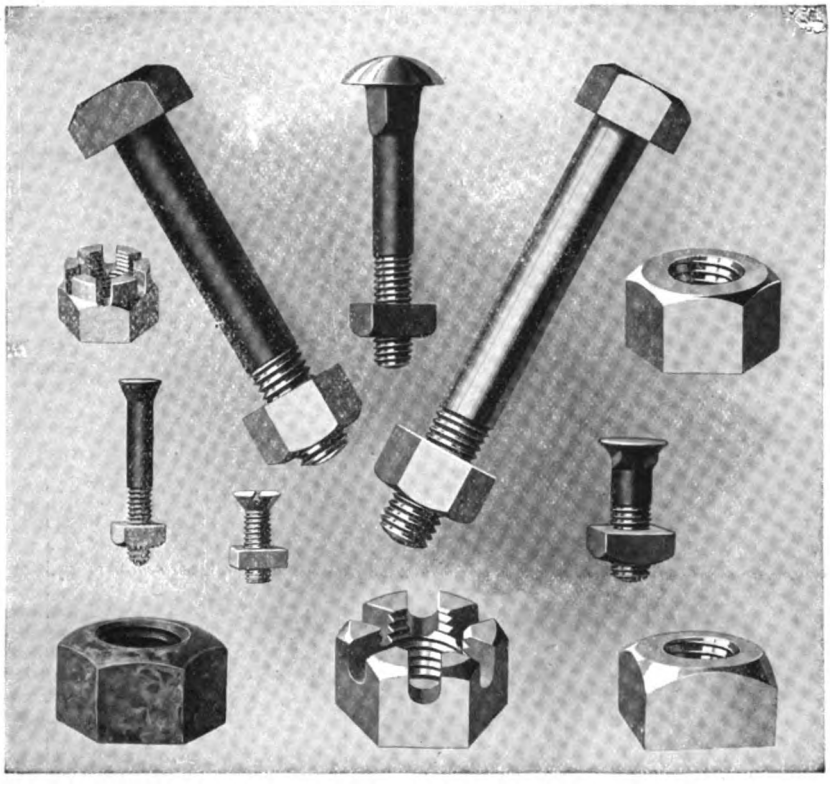
SEE OUR ADVTS. IN MECHANICAL ENGINEERING THE JOURNAL OF THE A.S.M.E.

Digitized by Google

RUSSELL, BURDSALL AND WARD BOLT AND NUT COMPANY

PORT CHESTER, N. Y.

Makers of EMPIRE Bolts, Nuts and Rivets



A HISTORY OF PIONEERING:

When you look at the history of the bolt and nut industry, with the revolutionary improvements in methods of manufacture that the last few decades have witnessed, you see the history of Russell, Burdsall & Ward.

For this house was the first to make cold punched steel nuts. It was the first to make cold headed bolts. It was the first to standardize and market its products under a trade-marked name—EMPIRE—for the protection of its customers; a name that means and unreserved guarantee of quality, from an institution of international repute.

WHERE EMPIRE PRODUCTS ARE MADE:

Out of this long career of pioneering has grown an organization occupying three huge plants, devoted exclusively to the production of bolts, nuts, rivets and washers. Among the mechanical facilities of these plants are ingenious automatic nut machines that have no duplicate anywhere in the industry. These machines cold punch, chamfer, trim and burnish in one operation, where in another plant five separate machines would be required. Not only does this method make for speedier production, but for a sounder and more uniform quality of product.

THOROUGH INSPECTION:

A staff of trained inspectors, under the expert guidance of a famous tool maker, keep a close watch over the work of each department. No goods not flawlessly perfect can pass muster—

For there is a reputation of 75 years' honorable dealing bound up in the quality of Empire Bolts, Nuts and Rivets.

Digitized by Google

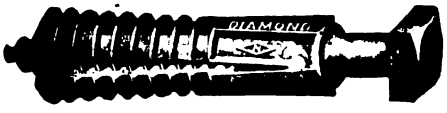
DIAMOND EXPANSION BOLT CO.

90 WEST ST., COR. CEDAR, NEW YORK

FACTORY: GARWOOD, N. J.

Manufacturers of "Diamond Specialties:" Expansion Bolts and Anchors, Drills, Cable and Pipe Clamps, Conduit Rods, Etc.

DIAMOND N-Y EXPANSION BOLTS:



"Diamond N-Y" Expansion Shields—Patented



"Diamond N-Y" Screw Anchors—Patented

"DIAMOND N-Y" TWO PART SHIELDS AND SCREW ANCHORS are used with standard lag screws and wood screws. For attaching light and heavy equipment to brick, stone or concrete walls.

DIAMOND "RAPID FIRE" DRILL:

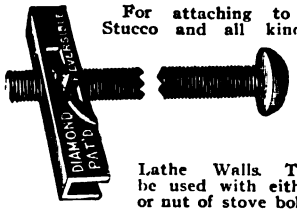


"Rapid Fire" Drill

Reduces cost of drilling hole in brick, stone and concrete. Strikes eight sharp blows with each turn of the crank. Points are interchangeable for all sizes of holes.



DIAMOND REVERSIBLE TOGGLE BOLTS:



For attaching to hollow tile Stucco and all kinds of metal Lathe Walls. Toggles may be used with either the head or nut of stove bolt exposed

EMPIRE CONDUIT RODS:

Patented No. 911,854, Feb. 9, 1909.



With or without Wheels

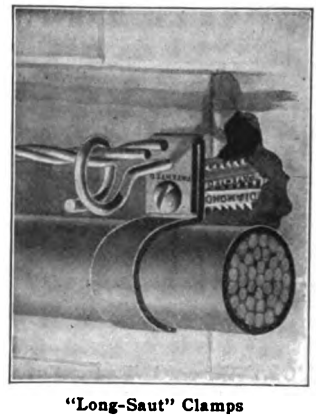
Made of best quality Hickory with quick-acting Automatic Couplings.

"LONG-SAUT" CABLE AND PIPE CLAMPS:

Used for attaching lead cable and parallel runs of bridle wire in *interior block distribution*.

This form of telephone construction is now being employed in all modern telephone plants.

"Long-Saut" Clamps are made to conform to every diameter of cable and may be used with or without bridle rings, as conditions require. Attached with Diamond Screw Anchors to brick, stone or concrete or with wood screws to wooden structures.



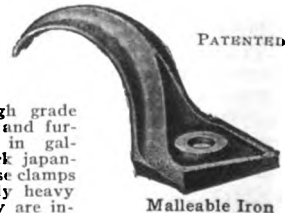
"Long-Saut" Clamps

DIAMOND MALLEABLE CLAMP:

For conduit, pipe and cable.

PATENTED

Made of high grade malleable iron and furnished either in galvanized or black japanned finish. These clamps are of extremely heavy design and they are intended for heavy duty.

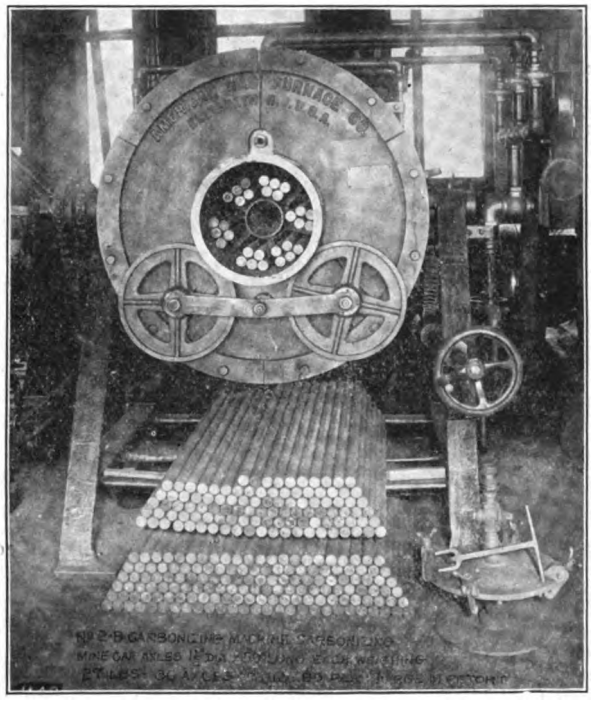


Malleable Iron One Hole

Digitized by Google

AMERICAN GAS FURNACE CO.

MAIN OFFICE & WORKS: ELIZABETH, N. J.



527

J

AMERICAN GAS FURNACE CO. PIONEERS IN 1878 LEADERS TODAY

LIST OF PRODUCTS:

Automatic Heat Controllers
Automatic Quenching Tanks
Blowers
Blowpipes, Hand and Stand
Boosters
Brass Melters
Brazing Furnaces and Tables
Burners
Burners for Electric Lamp Manufacture
Carbonizing Machines
Cluster Burners
Cyanide Furnace
Cylindrical Furnaces
Forges
Glass Burners
Glass Forges
Hardening Hammers
Heating Machines
Lead Hardening Furnaces
Melting Furnaces
Muffle Furnaces
Nipple Burners
Oil Tempering Furnaces
Oven Furnaces
Plating Furnaces
Radiator Burners
Rivet Heaters
Slot Burners
Soft Metal Furnaces
Soldering Iron Heaters
Sweep Reducing Furnaces
Tempering Plates
Tire Heaters
Tube Furnaces
Umbrella Burners

Every type of Gas Blast Burner, Furnace and Heating Machine for Industrial uses

Digitized by Google

AMERICAN INDUSTRIAL FURNACE CORP.

Sales Agents—Engineers—Contractors

10 POST OFFICE SQUARE, BOSTON, MASS.

ANNEALING AND NORMALIZING FURNACES:

Bituminous Coal Fired
Gas Fired
Electric

CARBURIZING FURNACES:

Bituminous Coal Fired
Gas Fired
Oil Fired
Electric

HARDENING FURNACES:

Electric
Gas Fired
Oil Fired

DRAWING FURNACES:

Electric
Gas Fired

INGOT AND BILLET FURNACES:

Bituminous Coal Fired
Gas Fired
Oil Fired

NOTE.—Furnaces for this work designed for hand firing or mechanical stokers and built with or without recuperators and with or without waste heat boilers.

FORGING FURNACES:

Gas Fired
Bituminous Coal Fired
Oil Fired

NOTE.—Built with or without recuperators.

MALLEABLE IRON FURNACES:

Bituminous Coal Fired
Gas Fired
Electric

FERROUS AND NON-FERROUS MELTING FURNACES:

Electric
Gas Fired

NON-FERROUS ANNEALING FURNACES:

Gas Fired
Electric
Coal Fired
Oil Fired

ENAMELING FURNACES:

Electric
Gas Fired

CORE OVENS:

Bituminous Coal Fired
Electric

ACCESSORY FURNACE EQUIPMENT:

Cold Gas Producers
Hot Gas Producers

OIL COOLING SYSTEMS:

Oil Cooling Refrigeration System
Oil Cooling Air Film System

THE AMERICAN INDUSTRIAL FURNACE CORP.

As an engineering organization insures the COORDINATED INSTALLATION of industrial furnace plants.

As a contracting organization it makes possible CENTRALIZED RESPONSIBILITY for results from industrial furnace plants.

It places at your command a combined engineering knowledge for the better solution of your industrial furnace problems.

Digitized by Google

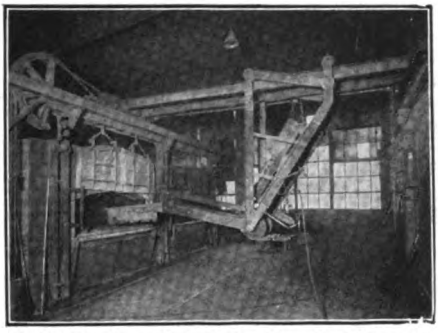
W. S. ROCKWELL COMPANY

50 CHURCH ST., NEW YORK

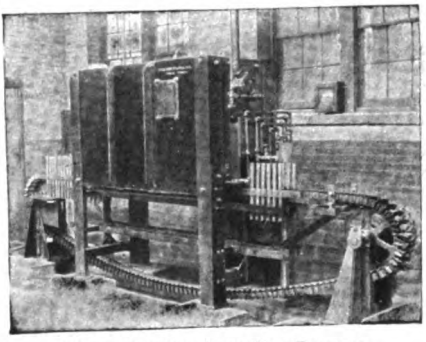
(Hudson Terminal Bldg.)

Furnace Engineers and Contractors

BRANCHES: CHICAGO—CLEVELAND—DETROIT



Twin-Chamber Underfired Heat-Treating and Carbonizing Furnace. Charging machine operated by air hoist



Automatic Tube Annealing Furnace.

COMPLETE INDUSTRIAL FURNACE EQUIPMENT

"FURNACE AND FUEL TO SUIT CONDITIONS"—is our rule governing consideration of new or improvement of existing furnace equipment to suit your needs under your plant conditions.

LET US HANDLE YOUR HEATING PROBLEMS

We make inspection of plant, devise methods of heating and handling material, furnish complete industrial furnace equipment adapted to your particular plant conditions, and guarantee results, using coal, oil, gas or electricity as your best interests require.

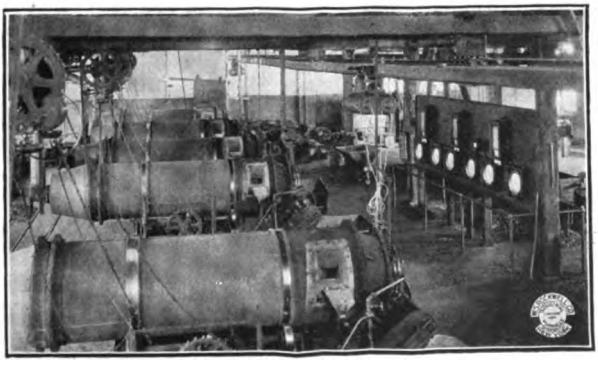
The following list of furnaces and appliances illustrates the variety of work we do and our familiarity with furnace and fuel problems:

Angle Heating Furnaces
Annealing Furnaces
Automatic Furnaces
Billet Heating Furnaces
Blast Gates, New Air Tight
Blowers
Carbonizing Furnaces
Cyanide Furnaces
Drying Furnaces
Enameling Furnaces
Forging Furnaces
Fuel Oil Appliances
Hardening Furnaces
Heat-Treating Furnaces
Heating Furnaces
Lead Pot Furnaces
Melting Furnaces
Muffle Furnaces
Plate Heating Furnaces
Rivet Furnaces
Rivet Rod Furnaces
Spring Fitting Furnaces
Soft Metal Melting Furnaces
Stoker Fired Recuperative Furnaces
Scaling Furnaces
Tempering Furnaces
Upsetting Furnaces
Varnish Boiling Furnaces
Wire Furnaces

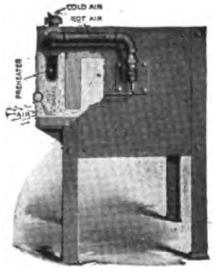
529

Write for Catalog

SEE OUR ADVTS. IN MECHANICAL ENGINEERING THE JOURNAL OF THE A.S.M.E.



Rotary Automatic Furnaces. Annealing and Hardening Small Parts



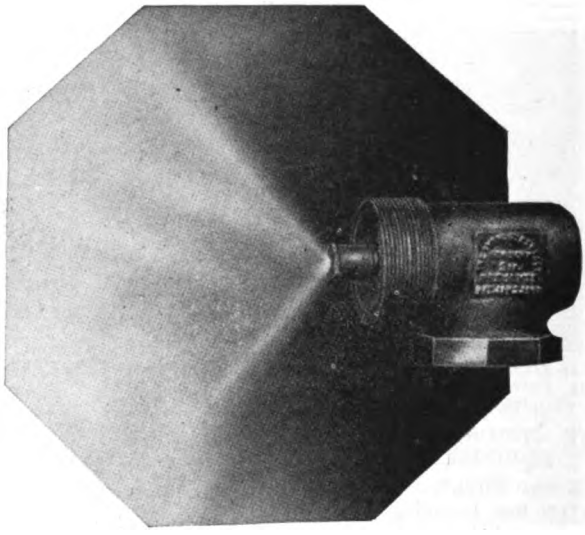
Economizer Forge showing deflection of hot gases, with induced air *toward* the furnace, and the preheating of air for combustion

Digitized by Google

THE ANTHONY COMPANY

138 WEST AVENUE, LONG ISLAND CITY, N. Y.

Liquid Fuel Engineers



Don't Waste Fuel

Consult Us

A Perfect Mist of Oil

ANTHONY NEBULYTE OIL BURNERS:

Low and High Pressure Designs to Suit Every Requirement.

A Trial Proves Their Unequalled Operating Characteristics.

ANTHONY NEBULYTE OIL-GAS BURNERS:

For Use with Either of These Fuels, or Both in Combination. No High Pressure Air Required.

ANTHONY CRUCIBLE FURNACES:

Large Output, Low Operating Cost, Long Crucible Life.

Soft Flame, Small Shrinkage, Non-oxidized Metal.

ANTHONY RIVET FORGES:

Compact, Portable, Economical, the Equal of Four Coal Forges.

ANTHONY OIL AND GAS BURNING EQUIPMENT:

For Annealing, Hardening, Forging, Melting—All Purposes.

ANTHONY OIL AND GAS BURNING SYSTEMS:

For Industrial Heating Processes.
For House Heating Uses.

ANTHONY NEBULYTE SPRAYS:

For Gas Machines.
For Any Other Purpose.

Digitized by Google

W. N. BEST FURNACE & BURNER CORP.

Successors to W. N. BEST, INC.

11 BROADWAY, NEW YORK

Engineers in Caloric: Liquid Fuel Equipment; Furnaces for Heating, Melting and Heat Treatment of Metals. High Pressure, Low Pressure, Volume Air, Air Carburetting and Mechanical Burners of All Sizes

W. N. BEST CALOREX LIQUID FUEL FURNACES AND EQUIPMENT:

Thirty Years' Experience in Handling Liquid Fuel. All Installations Guaranteed.

Designs for changing coal-fired furnaces to oil-fired, for the remodeling of existing oil-fired furnaces, and the construction of all forms of furnaces for heating and heat treatment of metals.

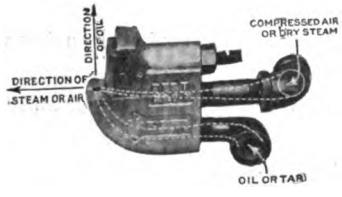
If your present liquid fuel equipment is not in every way satisfactory, it can be remodeled to give perfect results. We guarantee entire satisfaction.

To secure 100% economy and 100% efficiency use W. N. Best Oil and Tar Burners for Annealing, Case Hardening, Tempering, Forging, Heat Treating, etc.

W. N. Best High Pressure Burner Unmounted:

1. Note the direction of arrows. The air or steam meets the oil at right angles, thus thoroughly atomizing the oil externally, which prevents clogging or carbonizing, the burner always being kept clean.

2. By releasing the nut with T-handle wrench which we furnish, the steam orifice may be cleaned readily without disconnecting the burner.



High Pressure Burner

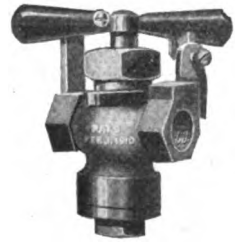
3. Air or dry steam from 15 pounds up can be used to atomize the oil.

4. The burner being in form of a syphon requires but very low oil pressure.

5. Burners can be fitted to throw either a long, narrow flame or a fan-shaped flame 9 feet wide, thus doing away with the necessity of using more than one burner in any fire-box or furnace that is 9 feet or less in width.

W. N. Best Oil Regulating Cock:

This regulating cock is provided with a V-shaped, knife-edged opening in the plug, which not only has a shearing action on heavy liquid fuels, but enables the operator to secure the finest possible adjustment.



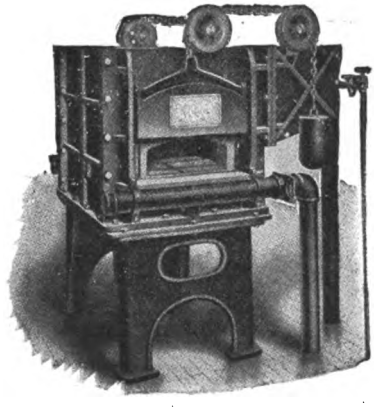
Oil Regulating Cock

When a furnace is working continuously on one class of work this cock can be set by the adjusting screw so that when the burner is stopped, it can be returned to the same adjustment when again started.

Class "D" Forge Furnace:

Designed especially for drop forge work, but can be used for a wide range of heating, welding, tempering, etc. By placing a muffle in the charging space, makes an ideal muffle furnace. Made with one or two charging openings.

531



Forge Furnace

The consuming fuel unites with the air necessary for perfect combustion in the combustion chamber before it reaches the charging space of the furnace—there is therefore no oxidation of the metal while being heated. The combustion chamber and arch are of such form and proportions that the flame and heat reverberate perfectly upon charging space of the furnace.

CALOREX

SEE OUR ADVTS IN MECHANICAL ENGINEERING THE JOURNAL OF THE A.S.M.E.

(See page 130 for additional products of this Company)

Digitized by Google

THE MAXON FURNACE AND ENGINEERING CO.

MUNCIE, INDIANA, U. S. A.

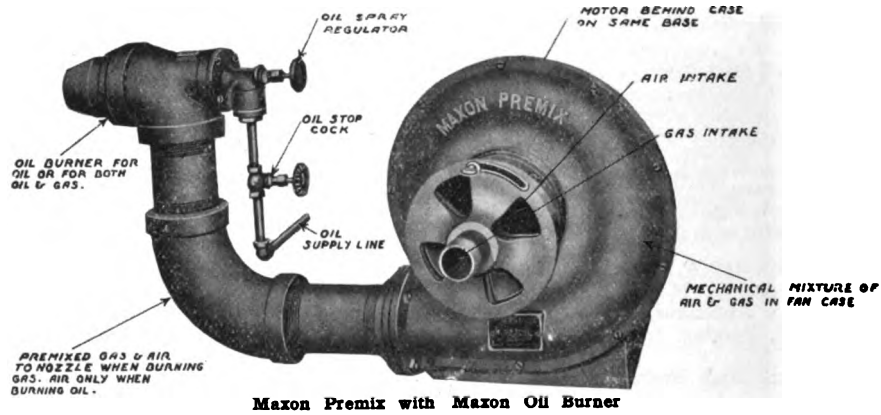
BRANCH OFFICES

NEW YORK CITY
CLEVELAND, OHIO

PITTSBURGH, PA.

CHICAGO, ILL.
COLUMBUS, OHIO

Fuel Combustion Engineers
Burners and Furnaces for Gas and Oil



Maxon Premix with Maxon Oil Burner

532

PRODUCT:

The sale of Maxon Premix Burners consuming gas or oil as fuel.

SERVICE:

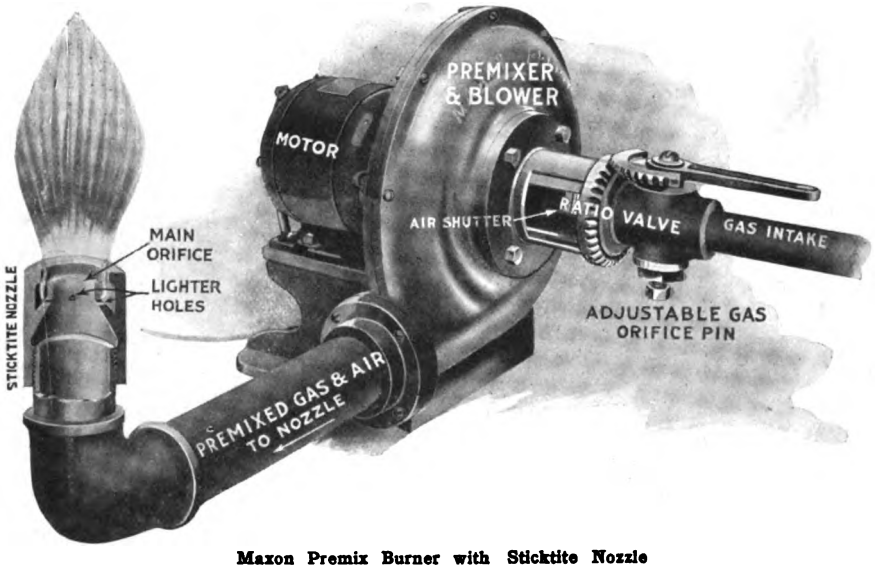
Our Engineering Staff will make surveys of industrial plants relative to applying the heat from the fuel best suited to obtain the results desired. Our policy is to develop increased earnings from your urnaces by the correct application of the fuel. We are prepared to redesign your present equipment or design and construct new furnaces introducing the use of Maxon Premix Burners to solve your fuel problems. We do not recommend changes on existing fuel burning equipment unless we can show a saving in fuel, power and increased production.

SUPERVISION:

We can supply you with fuel combustion engineers for supervising and making installations of Maxon Premix Burners in your plant.

Digitized by Google

THE MAXON FURNACE AND ENGINEERING CO.
MUNCIE, INDIANA



Maxon Premix Burner with Sticktite Nozzle

Maxon Oil Burner is used in connection with the Premix Blower which supplies the air to secure complete combustion. Atomization is secured by the construction of the spray head from the pressure of the oil alone. No excess air—no high pressure—low operating cost.

The principle of the Premix Gas Burner is to take the gas to be burned into the inlet of the fan case and the proper amount of air that is proportioned by the Ratio Valve to support the combustion of this gas and intimately and mechanically mix the two in correct proportions for complete combustion.

Sticktite Nozzle as shown in illustration keeps the flame from blowing away from the orifice, giving many advantages in open flame and muffle work.

APPLICATIONS:

Billet Furnaces
Boilers
Brass Melting
Brick Kilns
Carbonizing
Core Ovens
Deep Eye Pot Furnaces
Enameling Ovens
Glass Melting Day Tanks
Glazing Machines
Glory Holes
Heat Treating
High Speed Steel
Japanning Ovens
Lehrs
Plate and Angle Furnaces
Pottery Kilns
Reheating Furnaces
Soaking Pits

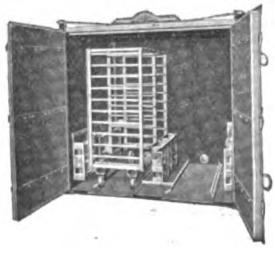
Digitized by Google

THE OVEN EQUIPMENT & MFG. CO.

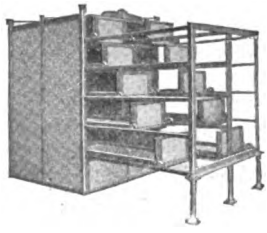
NEW HAVEN, CONN.

Manufacturers of Crawford Sectional Ovens and Enclosed Flame Gas Burners

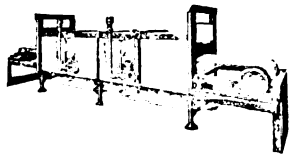
"CRAWFORD SECTIONAL" OVENS are used for the following heating processes: Baking enamels and japans in all colors and heats; vulcanizing hard rubber and substitutes; baking and drying food products, armatures, insulated wire, cores, molds, and abrasives.



Type 2 Electric Oven



Drawer Oven



Flat Conveyor Oven

"CRAWFORD SECTIONAL" OVENS are heated with our **ENCLOSED FLAME GAS BURNERS, ELECTRICITY, OR STEAM.**

STANDARD TYPE OVENS:

These ovens are built in every size which industrial needs demand. Goods may be handled on racks, trucks, or over-head rails. The simple, rigid design for taking care of the expansion and contraction, the high grade of insulation used, positive air circulation, and accurate temperature control—all insure durability and continued successful operation with the maximum economy.

SPECIAL OVENS:

Sectional construction and standardized units lend themselves very readily to the fabrication of special ovens. Our engineering service is always available for the discussion of equipment to meet individual requirements; our knowledge, gained from long experience with oven problems of every kind, is entirely at the disposal of our customers.

CONVEYOR OVENS:

Quantity production can be speeded up to the highest point by the use of our flat or vertical conveyor equipment. We build these ovens in a variety of sizes to facilitate rapid continuous baking.

TRUCKS:

We build all-steel *OVEN TRUCKS* with roller bearings.

Digitized by Google

AMERICAN METAL TREATMENT CO.

ELIZABETH, N. J.

Case-Hardening, Annealing, Hardening, Tempering, Coloring, Etc.

Our Specialties:

CASE-HARDENING HARDENING
ANNEALING TEMPERING
GUN METAL COLORING, ETC.



Fractured Ball Race

We case-harden in bulk parts in the following lines:

Adding Machine Parts
Ball Races
Bushings
Cams
Canning Machine Cams
Gears, Spur Bevel and Worm
Hoisting Engine Parts
Pins and Shafts
Printing Press Parts
Rolls for Various Purposes
Screw Machine Products
Sprockets
Stampings of all kinds
Typewriter Parts

SEE OUR ADVTS IN MECHANICAL ENGINEERING THE JOURNAL OF THE A.S.M.E.

Solid and Hollow Spindles for Screw Machines, Lathes and Grinding Machines, Wrist Pins and Sleeves for Automobile Engines and the largest Stationary Engines.

Improved Method of "Local" Case-Hardening:

Our method of local case-hardening makes it unnecessary to protect piece by banding or coating the portions desired soft; and it reduces warping. The blank is roughed out to grinding limits at the places to be hardened. After carbonizing—the carbonized skin is removed from the "soft places." The piece is now heated and quenched at the desired temperature. The "soft places" can now be machined to size.

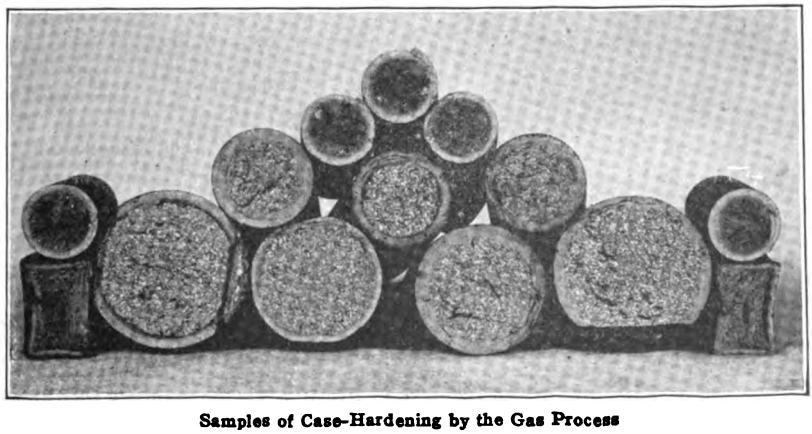
If you have a proposition adapted to that treatment call upon our engineering staff for recommendations and advice.

"Carbonia" Finish:

"Carbonia" Finish is a kind of Gun-Metal finish for steel and iron parts, though of a deeper, richer black than the average Gun-Metal.

"Carbonia" was first applied to clothing buttons and buckles, then harness and saddlery hardware. It has been adopted by nearly all of the larger fire-arms manufacturers of the country and now is used on electrical, typewriter and adding machine parts. It is also applicable to the humbler metal goods—such as shoe-lace tips, etc.

This finish is not rust-proof; but is a very good protector.



Samples of Case-Hardening by the Gas Process

Digitized by Google

THE ELECTROLABS COMPANY

MAIN OFFICE AND WORKS, PITTSBURGH, PA.

Cable Address: "Electrolab"

BRANCH OFFICES

PHILADELPHIA NEW YORK SAN FRANCISCO

Manufacturers of Complete Plants for the Production, Distribution, Compression and Utilization of Oxygen and Hydrogen Gases

USES AND COMPARATIVE COST:

The Oxy-Hydrogen Generator manufactured by us under the Levin patents is for use wherever an uninterrupted, pure supply of oxygen, hydrogen, or both of these gases are required.

The cost of oxygen by the Electrolabs System is but one-third the price you pay for cylinders, and in addition to the oxygen, you get twice its volume of hydrogen free. Space required is no greater than that which you now use for cylinder storage.

CONSTRUCTION AND SIZES:

The generating cell is manufactured on the unit principle. By building or uniting these units into batteries any desired volume of gas may be obtained.

536



Electrolabs Generator, Type "B"

The design and construction is simple, rigid and compact. Production methods are used in manufacturing thereby obtaining a product always of the same high quality with interchangeable parts. As the material used in the construction of the cell will not deteriorate or decompose under the influence of the electrochemical action of the cell, Electrolabs generators enjoy the distinctive advantage of being delivered as an entirely welded, completely assembled, rigid unit.

Specially designed sight-feed indicators are placed between generator and gas offtake pipe.

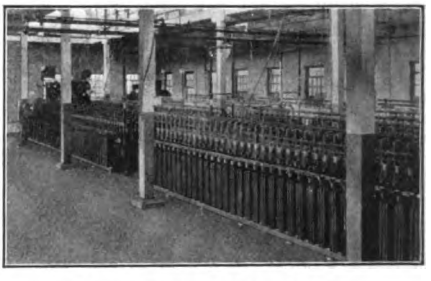
Electrolabs generators have no maintenance or replacement expense for packing joints—they have no joints to pack. There are no bolts to insulate—no leaks to remedy.

Units made in two sizes:

Type A—Delivers 2 cu. ft. of Oxygen and 4 cu. ft. of Hydrogen each hour at 250 amperes.
Type B—Delivers 4.8 cu. ft. of Oxygen and 9.6 cu. ft. of Hydrogen each hour at 600 amperes.

SAFETY:

The safety of a gas generating set depends upon the continuous purity of the gas produced. Users of Electrolabs



Plant of the Paschall Oxygen Co.
1000 Electrolabs Generators, Type "A"

equipment report that the purity of gases coming direct from the generators is 99.8% and better.

OUR SERVICES:

Not only do we manufacture the entire equipment but we also arrange and assume entire responsibility for the installation of the complete plant. We guarantee prompt deliveries and make them.

We have the privilege, through the courtesy of owners, of referring you to plants where you may see our equipment in successful operation. Engineers desiring to take advantage of this opportunity, please write us.

As specialists in oxygen and hydrogen gas generation we are always pleased to discuss problems in our field. Our accumulated experience is at your command.

Third and fourth REPEAT ORDERS testify to satisfaction our plants give our users.

Digitized by Google

WILSON WELDER & METALS COMPANY

INCORPORATED

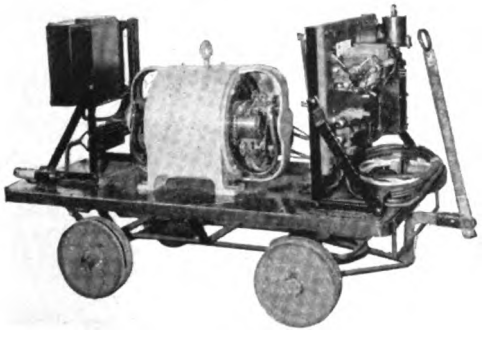
259 36TH STREET, BROOKLYN, N. Y.

Manufacturers of Wilson PLASTIC-ARC System

WILSON **Plastic-Arc** SYSTEM:

TRADE MARK

The electric arc welding system that repaired the maliciously damaged cylinders on the interned German ships.



Standard Portable One Arc Unit with Type KB Panel. Two arc portable units also furnished. For stationary service either one, two or four arc units, either electric motor or belt drive

Constant heat per unit area in the weld is assured by the automatic heat controlling panel which is to welding what the Pyrometer is to the heat treatment of metals—it eliminates guess work.

PATENTS:

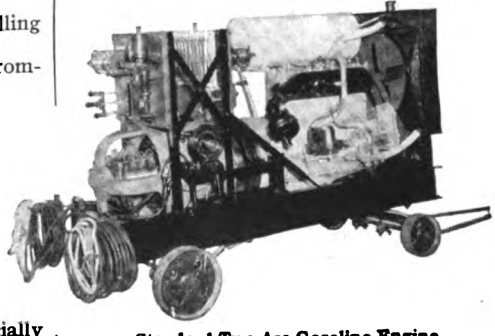
The Wilson **Plastic-Arc** System of Electric Welding and Specially Prepared Wilson **Plastic-Arc** Certified Welding Metals are protected by Letters Patent of the United States, by Foreign Patents, and by patents pending.

Broken Heavy machinery repaired in place without preheating or distortion.

Wilson **Plastic-Arc** Certified Welding Metals are guaranteed to give satisfactory results when employed upon the type of work each is designed for. Will weld any weldable metal as: Cast malleable and wrought iron, cast and rolled steel, bronze, brass, copper, etc.

These welding metals will give good results with any electric arc welding system.

For machineable Cast Iron Welds, without studs, specify Wilson **Plastic-Arc** Certified Welding Metal, Grade No. 12.



Standard Two Arc Gasoline Engine Driven Unit with Type KA Panels. Also Furnished in One Arc Capacity

Bulletins on Request.

Demonstrations at special stations by appointment.

Digitized by Google

QUASI-ARC WELTRODE CO., INC.

114 HUDSON AVE., PEEKSKILL, NEW YORK

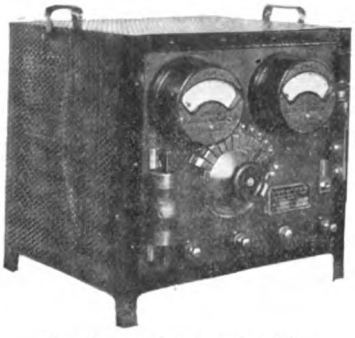
BRANCHES IN ALL FOREIGN COUNTRIES — AGENTS IN PRINCIPAL CITIES OF U. S. A.

Manufacturers and Dealers in Electric Welding Apparatus and Quasi-Arc Patented Coated Electrodes

WELDING EQUIPMENT:

By this system equally good results are attained with either Alternating or Direct Current.

For use with Alternating Current of any voltage, phase or frequency, we supply inexpensive transformers for the proper reduction of voltage, and Resistance-Controllers (shown below) for accurate regulation of current.



Standard Resistance-Controller

For use with Alternating or Direct Current at 80–110 volts. Size 18″ x 18″ x 16″. Weight 75 lbs. Cost of complete apparatus (transformer, controller and all accessories) for one operator, less than $500.



Standard Reactance-Controller

For use with Direct Current only at 50–60 volts. Size 11″ x 18″ x 18″. Weight 100 lbs. This Controller replaces the old-style auxiliary-welding-panel of all multiple-operator sets, gives much closer regulation of current, and is a great time saver because always close to the work.

When conditions require the use of welding generators, we supply them in all sizes, driven by direct-coupled motor, or gas engine. These generators give constant potential current at 55 volts. Price according to size and method of drive.

WELDING ELECTRODE:

These are the original Coated Metal Electrodes, which are fully protected by U. S. and foreign patents. Should not be confused with the inferior imitations now on the market, or with the "dipped" or "painted" electrodes sometimes offered as a substitute.

After the most extensive and exacting tests, the genuine Quasi-Arc "weldtrodes" have received the official approval of Lloyds Register of Shipping for use in ship construction.

Welds made with these electrodes—Have not only exceedingly high tensile strength and elongation, but also singular endurance under alternating stresses which quickly destroy welds made by other methods.

Are soft and ductile, permitting easy chipping, caulking or machining.

Will not corrode, because of the purity of the deposited metal.

Are made at a speed of 30–50% faster than can be attained with bare, or "dipped" electrodes.

Require only 50–60% of the amperage necessary to fuse bare electrodes of the same cross-section.

The Electrodes are made in various diameters; and of special compositions for use on Mild Steel, Carbon Steel, High Manganese Steel and Cast Iron.

The Weldtrodes for Cast Iron will give (if used according to our instructions) a deposit which can be easily machined on lathe, planer, or milling-machine.

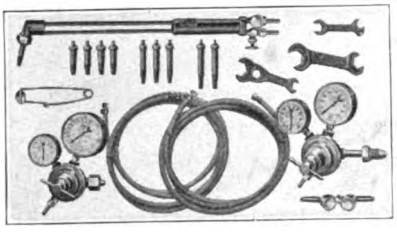
Catalogs, estimates and other information on request.

Digitized by Google

THE BASTIAN-BLESSING COMPANY

125 W. AUSTIN AVE., CHICAGO, ILL.

Manufacturers of REGO Oxyacetylene and Oxyhydrogen Welding and Cutting Outfits and REGO Regulators



REGO Outfits:

REGO outfits are furnished in all sizes, and with full equipment, including assortment of tips, REGO oxygen and acetylene regulators, oxygen and acetylene hose, wrenches, goggles, and torch lighter; carefully packed in a sturdily built wooden carrying case with metal handle.

Economy:

REGO torches in actual service have demonstrated a saving of from $300 to $500 per year, per torch, in oxygen consumption, as compared with other torches.

In tip maintenance REGO cost is approximately 10% of the usual tip maintenance cost per year, due to REGO drawn copper tips made in one piece.

No Flash-Back:

The REGO principle of gas mixture automatically protects REGO torches against flash-back, under any condition of operation.

You can plunge the tip of a REGO torch into molten metal and it will not flash back. The action of the acetylene automatically dams the flow of oxygen under conditions which in other torches would result in flash-back.

REGO Neutral Flame:

The REGO principle of gas mixture secures a true neutral flame by burning equal volumes of acetylene and oxygen. This eliminates burned welds, which are the result of an oxidizing (excess oxygen) flame, and carbonized welds which are the result of excess acetylene.

Wide Range of Sizes:

REGO torches are made in a wide range of sizes, from the largest outfits down to outfits used by jewelers.

Torches also include decarbonizing outfits.

Strength and Construction:

REGO torches are sturdily constructed.

They are conveniently designed for easy manipulation on the part of the operator.

The tip union nut construction insures a perfect fitting tip and guards against any possibility of gas leakage around the tip.

Descriptive Literature:

REGO principle of gas mixture is the most advanced step in the development of acetylene welding and cutting torches.

It overcomes all the difficulties present in other forms of construction, and insures perfect welding and cutting results, with the absolute minimum of attention on the part of the operator.

All the data surrounding the REGO principle of gas mixture is thoroughly discussed in our complete book **"Facts"** in which is also shown a full color chart from actual photographs showing both proper and improper welding flames.

This booklet is prepared for the man who wants to understand correct welding.

Send for your copy.

Digitized by Google

THE ALEXANDER MILBURN COMPANY

BALTIMORE, MARYLAND

NEW YORK Grand Central Palace | PHILADELPHIA Bourse Bldg. | CHICAGO 15 E. Van Buren St. | PITTSBURGH 202 Martin Bldg. | SAN FRANCISCO 268 Market St.

Manufacturers of Oxy-Acetylene Welding and Cutting Apparatus and Portable Carbide Lights

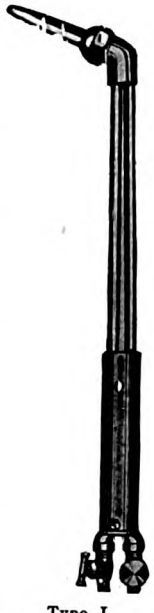
Milburn Oxy-Acetylene Welding and Cutting Apparatus is the result of research and constructive design dating back to the infancy of the industry.

During the last ten years Milburn engineers have been largely instrumental in the development and improvement of the art of autogenous welding and cutting.

MILBURN QUICK-WELD TORCH:

Triplicate Gas Mixture.
Multiple Jets.
Equal Pressure.

In the publication issued May 1921, entitled "An investigation of Oxy-Acety-Welding and Cutting Blow Pipes," it is stated on page 6, Item A, "That the blow pipes most subject to the so-called phenomena of flash-back are those in which the oxygen is delivered at a pressure in excess of that at which the acetylene is delivered." The Milburn Welding Torches have reached that goal towards which manufacturers have been working for years, EQUAL PRESSURE ON THE OXYGEN AND ACETYLENE GASES.



Type J
Welds on Equal Pressures

MILBURN CUT-WELD TORCH:

Changes from a welder to a cutter by simple change of tips.

Other types of Milburn Torches are made for rivet cutting, boiler tube cutting, carbon burning, lead burning, jewelry, dental and surgical instrument manufacturing, etc.

The Milburn Line includes every device and apparatus from the smallest jeweler's torch to complete generator plants for industrial and shipyard installation.



Combination Welding and Cutting Torch

MILBURN CARBIDE LIGHTS:



For night illumination anywhere out doors, for construction work, railroads, mines, quarries, dredges, locomotive or farm tractors. These Lights range in size from the small 100 candle power lamp to large Flood Lights of 15,000 candle power. They use ordinary lump carbide, obtainable everywhere.

(Write for booklet 335.)

Digitized by Google

SMITH'S INVENTIONS, INC.

2636 4TH ST., S. E., MINNEAPOLIS, MINN.

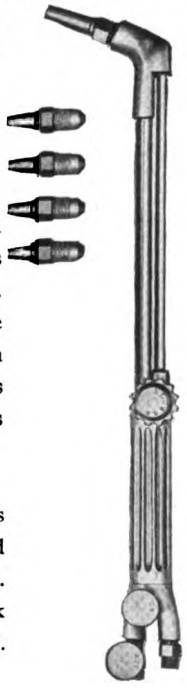
Manufacturers of Oxy-Acetylene and Oxy-Hydrogen, Welding and Cutting Apparatus, Pre-Heating Torches, Generators and Accessories

SMITH'S KEROSENE PRE-HEATING TORCH:

For use with compressed air.



Torch is mounted on a stand adjustable to any position or can be held in the hand. Flame can be regulated from six inches to six feet. Connect long hose to air line, drop short hose in can of kerosene, turn on air and light torch—there is nothing to generate. Solves every preheating problem.



NO. 15 SMITH CUTTING TORCH:

Note the large milled wheel that operates the cutting jet valve. This valve is made with a double pitch thread so that it opens rapidly and stays where it is set.

This torch continues to work after the end of tip is burned off. For heavy hot work you cannot beat it. All copper tips.

SMITH'S NO. 6 HEAVY DUTY TORCH:



A high grade welding torch with interchangeable cutting tip of six inches cutting capacity.

No job is too big or too small for this torch.

541

SMITH'S AUTOMATIC ACETYLENE GENERATORS:



Made in 30–50–100 and 200 lbs. carbide capacities. Generates Acetylene right in your own shop saving 75% of your acetylene cost in drums. One of these Generators will free you forever from having to depend on uncertain deliveries of gas in drums.

Operates at whatever pressure is needed and is adjustable to almost any requirement.

Smith's Oxy-Acetylene and Oxy-Hydrogen welding and cutting equipment is a complete line from complete generator plants to smallest accessory.

Write for Catalog No. 3 with prices.

Digitized by Google

Digitized by Google

Compressors, Blowers, Pumps, Hydraulic Machinery, Industrial Machinery, Steel Plate Work

EQUIPMENT CATALOGUED IN THIS DIVISION

Data begins on page number given, as closely as can be divided. Consult Directory Section (green pages) for specific products.

	PAGE		PAGE
Accumulators, Hydraulic	591	Paper Mill Machinery	646
Air Conditioning Apparatus	617	Paving Blocks	661
Blowers	553	Presses, Hydraulic	590
Boilers, Heating	622	Pumping Outfits	586
Brick Making Machinery	598	Pumps, Centrifugal	564
Carton Sealing Machinery	645	Pumps, Deep Well	569
Centrifugals	614	Pumps, Power	567
Clay Working Machinery	598	Pumps, Rotary	563
Compressors, Air	545	Pumps, Steam	562
Crushing Machinery	598	Pumps, Vacuum	559
Drafting Room Equipment	663	Refrigerating Machinery	628
Dredges, Hydraulic	588	Rolling Mill Machinery	641
Drying Apparatus	606	Salt Plants	613
Dust Collecting Systems	554	Sand-Blast Equipment	636
Evaporators	607	Screens, Perforated Metal	653
Exhausters	553	Steel Plate Construction	651
Fans	553	Tanks	650
Foundry Equipment	634	Textile Machinery	642
Grating	662	Tools, Pneumatic	546
Insulating Machinery	638	Valves, Hydraulic	589
Hydraulic Machinery	590	Wire Rope Machinery	639
Kilns	612	Wire Stranding Machinery	639
Oil Well Equipment	648		

See next page for list of firms catalogued

CATALOGUE SECTION

PART VII **Pages 543-663**

Digitized by Google

INDEX TO FIRMS CATALOGUED IN PART VII

A

	PAGE
Allington & Curtis Mfg. Co.	554
American Blower Co.	553
American Insulating Machinery Co.	638
American Steam Pump Co.	562
American Tool & Machine Co.	614
Atmospheric Conditioning Corp'n.	617
Automatic Carbonic Machine Co.	628
Automatic Refrigerating Co.	629

B

Beach-Russ Co.	560
Biggs Boiler Works Co.	650
Blackmer Rotary Pump Co.	563
Bonnot Co.	598
Burroughs, Charles Co.	590
Bury Compressor Co.	545

C

Carbondale Machine Co.	630
Carrier Engineering Corp'n.	620
Chambers Brothers Co.	599
Chicago Pneumatic Tool Co.	548
Clarage Fan Co.	556, 557
Connery & Co. (Inc.)	651
Cook, A. D. (Inc.)	585

D

Davidson, M. T. Co.	565
Davis & Furber Machine Co.	642
Dayton-Dowd Co.	566
Deming Co.	567
Devine, J. P. Co.	606, 607
Drying Systems (Inc.)	618, 619

E

Economy Pumping Machinery Co.	568
Ellicott Machine Corp'n.	588
Elmes, Charles F. Engrg. Works.	591

F

Farrar & Trefts (Inc.)	652
Frost Mfg. Co.	634

G

Galland-Henning Mfg. Co.	592
Goulds Mfg. Co.	570, 571, 572, 573

H

Hastings Pavement Co.	661
Hendrick Mfg. Co.	653
Honhorst, Jos. Co.	654
Hydraulic Press Mfg. Co.	593

I

Ingersoll-Rand Co.	546, 547
Ingersoll-Rand Co. (A. S. Cameron Steam Pump Works)	564
Irving Iron Works Co.	662

K

Kewanee Boiler Co.	622, 623, 624
Koven, L. O. & Brother	605

L

Lammert & Mann Co.	561
Lancaster Iron Works (Inc.)	656, 657
Larner-Johnson Valve & Engineering Co.	589
Lasker Iron Works	655
Louisville Drying Machinery Co.	608
Luitwieler Pumping Engine Co.	569

M

McGowan, John H. Co.	574, 575
Manistee Iron Works Co.	576
Metalwood Mfg. Co.	594
Morris Machine Works	578, 579
Morrison Bros.	658

N

National Supply Co.	648, 649
New England Butt Co.	639
New England Wire Machinery Co.	640
New York Blower Co.	555
New York Central Iron Works Co. (Inc.)	659
Northern Fire Apparatus Co.	577
Novo Engine Co.	586, 587

O

Oil & Waste Saving Machine Co.	615

P

Pangborn Corp'n.	636, 637
Pease, C. F. Co.	663
Perkins, B. F. & Son (Inc.)	558
Philadelphia Drying Machinery Co.	610
Prescott Co.	580

R

Robertson, John & Co.	595
Royle, John & Sons	643
Ruggles-Coles Engineering Co.	609

S

Sandusky Foundry & Machine Co.	646
Scaife, Wm. B. & Sons Co.	660
Skinner Bros. Mfg. Co. (Inc.)	621
Smidth, F. L. & Co.	604
Smith, H. B. Co.	626, 627
Spencer Turbine Co.	552
Standard Sand & Machine Co.	635
Steacy-Schmidt Mfg. Co.	612
Sturtevant Mill Co.	600, 601
Sullivan Machinery Co.	549
Swenson Evaporator Co.	611

T

Taber Pump Co.	581
Textile Machine Works	644
Tolhurst Machine Works	616
Torrington Mfg. Co.	641

U

Union Engineering Co.	645
Union Steam Pump Co.	582

V

Valley Iron Works Co.	647
Vogt, Henry Machine Co.	632, 633

W

Warren Steam Pump Co.	583
Watson-Stillman Co.	596
Westinghouse Traction Brake Co.	550, 551
Wilbraham-Green Blower Co.	559
Willcox Engineering Co.	613
Williams Patent Crusher & Pulverizer Co.	602, 603
Wing, L. J. Mfg. Co.	625
Wood, R. D. & Co.	597

Y

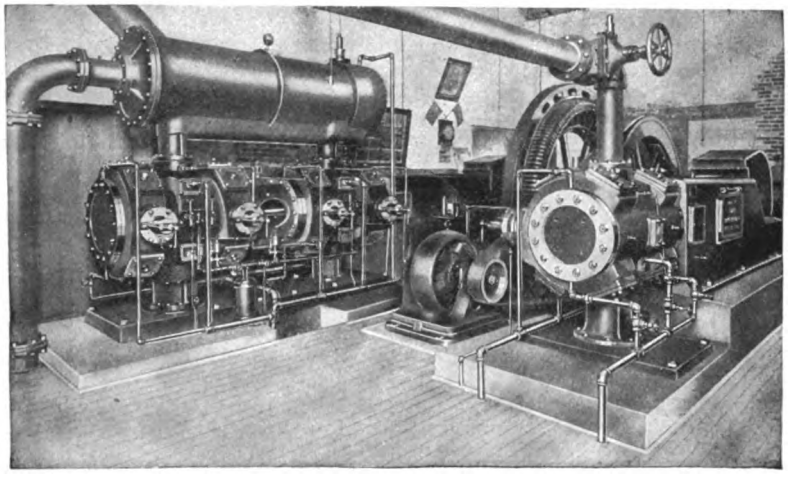
Yeomans Brothers Co.	584
York Mfg. Co.	631

Digitized by Google

BURY COMPRESSOR CO.

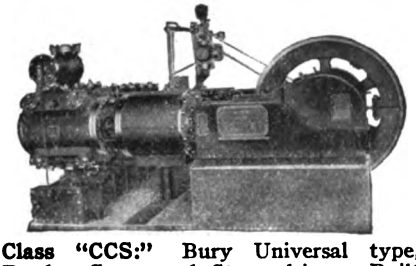
MAIN OFFICE AND WORKS

1701 CASCADE STREET, ERIE, PA.

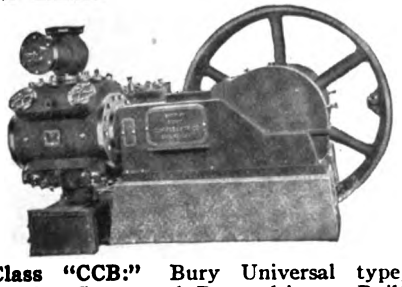


BURY "UNIVERSAL" COMPRESSORS: Bury Universal Variable Volume 3-Cylinder, 2-Stage Class "VCCE" (Illustrated above):

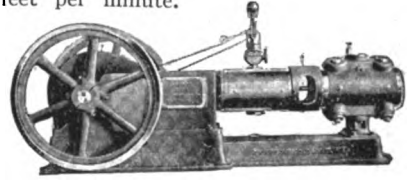
2-stage, 3-cylinder, Variable Volume, direct-connected with synchronous motor on shaft. Built in capacities 300 to 10000 cu. ft. per min. Also built belt drive.



Class "CCS:" Bury Universal type, Duplex, Compound, Steam driven. Built in capacities from 450 to 3000 cubic feet per minute.



Class "CCB:" Bury Universal type, Duplex, Compound, Power driven. Built in capacities from 450 to 3000 cubic feet per minute.



Class "LS:" Single-stage, Steam driven, with enclosed frame and flood lubrication. Built in capacities from 45 to 448 cubic feet per minute.



Class "L:" Single-stage, Power driven, with enclosed frame and flood lubrication. Built in capacities from 17 to 448 cubic feet per minute.

The Patented **Bury "Universal" Pyramid Box Plate Valves** are 50% greater in area than any other compressor valve.

Durable as the Pyramids. Silent as the Sphinx.

Bury Compressors built for all pressures and capacities up to 10,000 feet per minute.

Digitized by Google

INGERSOLL-RAND COMPANY

11 BROADWAY, NEW YORK

BOSTON, BIRMINGHAM, BUTTE, CHICAGO, CLEVELAND, DENVER, DETROIT, DULUTH, EL PASO, HOUGHTON, JUNEAU, KNOXVILLE, LOS ANGELES, NEW ORLEANS, PHILADELPHIA, PITTSBURGH, ST. LOUIS, NEW YORK, ATLANTA, DALLAS, WASHINGTON, SALT LAKE CITY, SAN FRANCISCO, SCRANTON, SEATTLE

Builders of Pneumatic Machinery

Air and Gas Compressors, Turbo Blowers, Vacuum Pumps, Oil Engines, Air Lift Pumping Systems, Condensers, Pneumatic Riveting and Chipping Hammers, Drills, Wood Boring Machines, Sand Rammers, Hoists, Rock Drilling and Metal and Coal Mining Machinery, Tie Tamping Outfits

Ingersoll-Rand and Imperial Reciprocating Air and Gas Compressors:

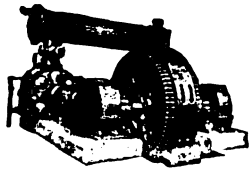
High grade, efficient machines of modern design, capable of continuous, high duty service.

"Imperial Fourteen," belt driven, vertical machines range in capacity between 3 and 45 cu. ft. per minute at pressures to 150 lbs. per square inch. Bulletin 3039.

Ingersoll-Rand Class "ER," power, and Class "FR," steam, are single stage in capacities between 28 to 1086 cu. ft. per minute at pressures between 10 to 125 lbs. per square inch. Bulletins 3330 and 3131.

"Imperial" Type "XCB," belt driven, Type "X," Meyer valve steam engine, and Type "XPV," piston valve steam engine driven duplex machines are to be had either single or two stage in capacities from 198 to 5155 cu. ft. per minute and for pressures between 15 to 110 lbs. per sq. inch. Bulletins 3042, 3311 and 3033.

"Ingersoll-Rand" Class "PRE," electric driven and Class "ORC," Corliss engine driven machines are duplex units of large capacity. Bulletins 3126 and 3129.



The Company is also prepared to build compressors to meet special conditions of service.

Ingersoll-Rand Turbo Compressors:

Direct connected steam turbine driven multi-stage centrifugal compressors for handling volumes from 3500 to 10000 cu. ft. per minute at pressures to 100 lbs. per sq. inch.

Ingersoll-Rand Turbo Blowers:

Turbo blowers for blast furnaces, copper and lead smelters, Bessemer converters, single-stage blowers for foundry cupolas, oil burners and other low pressure requirements.

Built direct connected to low, mixed or high pressure steam turbine, electric motor or Pelton Wheel.

Capacities from 3000 cu. ft. per minute on up at pressures from 1 to 100 lbs. per sq. inch.

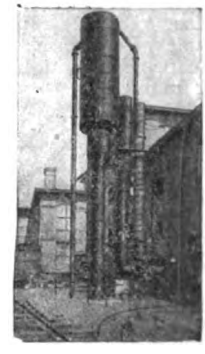


Ingersoll-Rand Condensing Equipment:

Counter-current barometric, low level multi-jet and high vacuum surface condensers, I-R vacuum pumps and Cameron circulating water pumps. Built to meet all service conditions in turbine and engine work and with vacuum pans, evaporators, dyers, etc.

I-R Barometric condensers can be used continuously with acid or gritty cooling water without necessitating cleaning or repair. Maintain highest vacua with less cooling water. Bulletin 9224.

For description of low level multi-jet see Bulletin 9032. For surface condenser see special literature.



Digitized by Google

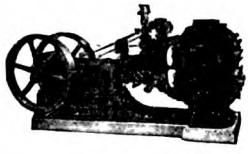
INGERSOLL-RAND COMPANY — NEW YORK, N. Y.

"Ingersoll-Rand" and "Imperial" Dry Vacuum Pumps:

Built for service wherever a highly efficient machine is wanted to maintain vacua up to 26–29.5 ins. Mercury (referred to 30″ barometer). High speed machines that require less than half the usual floor space.

"Ingersoll-Rand" Class "ER," belt driven, and Class "FR," steam driven straight line units range in capacity from 292–2295 cu. ft. per min. Bulletin 3137.

"Imperial" Type "XB," belt driven, and "Imperial" Type "X," steam driven are duplex machines built in capacities from 1048 to 7058 cu. ft. per minute. Bulletin 3138.



"Little David" Pneumatic Tools:



Simple, sturdy and efficient tools built in a complete range of types and sizes—a tool for every duty.

Little David Drills—28 sizes.

Little David Wood Borers—4 sizes.

Little David Portable Grinders—3 sizes.

Little David Riveters—5 sizes.

Little David Chippers—8 sizes.

Little David (Bench and Floor) Sand Rammers.

Little David Air Motor Hoists—½ to 5 tons.

I-R Drift Bolt Driver.

Little David Calking Machine.

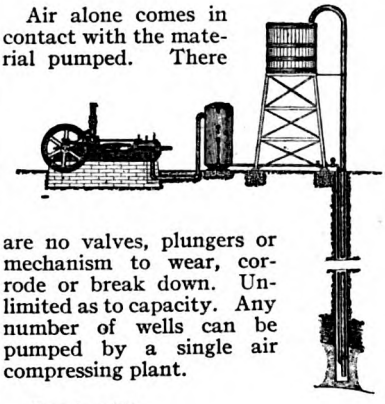
Catalog 8000.



Air Lift Pumping Systems:

For pumping deep wells, flowing salt or oil wells, elevating corrosive or gritty fluids, handling acids, pumping marl or pulpy mixtures, handling sewage, unwatering mines, etc.

Air alone comes in contact with the material pumped. There



are no valves, plungers or mechanism to wear, corrode or break down. Unlimited as to capacity. Any number of wells can be pumped by a single air compressing plant.

Catalog 77.

Other Ingersoll-Rand Products: 547

"Jackhamer" Rock Drills for drilling down holes to 25 feet. Hand held.

"Leyner" Drills. Mounted type for tunnel driving and mining.

"Stopehamer" Rock Drills for up-hole drilling.

"Sergeant" Drills for deep hole and subaqueous drilling.

"Leyner" Sharpeners for making and resharpening bits, making bolt heads and light forgings.

"Calyx" Core Drills for prospecting and testing rock strata and formations underlying earth's surface.

"New Ingersoll" Punching Machines and "Radialax" column mounted cutters for coal mining.

"Little Tugger" Hoists for use wherever portable hoisting or hauling power of ½ ton capacity is reached.

"Imperial" Tie Tampers for compacting railroad ballast of any sort on steam or electric lines.

Price Oil Engines.

Vertical, Multi-cylinder Marine Engines—220 to 750 H.P.

Vertical, Multi-cylinder Stationary Engines—105 to 1000 H.P.

Horizontal, Single-cylinder Engines—45 and 90 H.P.

Catalogs describing any of the products of the company will be sent you gladly upon request. Address the nearest office.

Digitized by Google

CHICAGO PNEUMATIC TOOL CO.

CHICAGO PNEUMATIC BUILDING: 6 E. 44TH STREET, NEW YORK

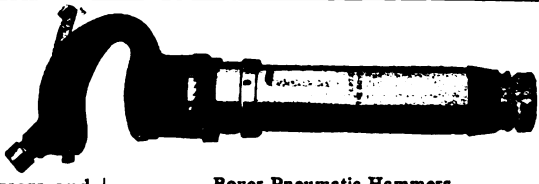
SALES AND SERVICE BRANCHES ALL OVER THE WORLD

Electric Drills, Air Drills, Pneumatic Hammers, Oil, Gas and Steam Engines, Air Compressors

"CHICAGO PNEUMATIC"

Depend upon that Name

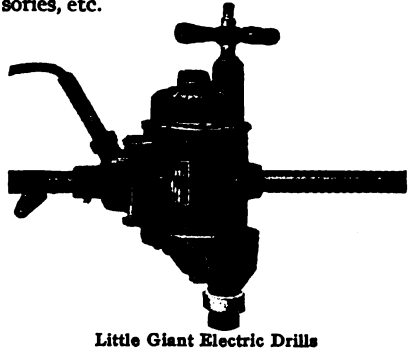
for



Boyer Pneumatic Hammers

Chicago Pneumatic Air Compressors and Vacuum Pumps; Giant Oil, Gas and Steam Engines. **Little Giant Electric Tools:** Portable Drills, A. C., D. C., and Universal types; Drilling Stands, Track Drills, Spike Drivers; Grinders, A. C., D. C., and Universal types; Universal Precision Grinders, Hammer Drills. **Pneumatic Tools:** Boyer Riveting and Chipping Hammers, Stone Tools, Sand Rammers, Holder-Ons, Jam and Yoke Riveters; Little Giant Pneumatic Drills and Grinders; Pneumatic Geared Hoists, Winches and Motors, Air Hose, Accessories, etc.

548



Little Giant Electric Drills

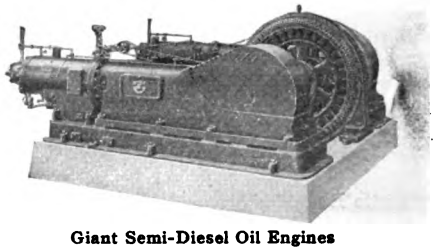
Made in a complete line for operation on A. C., D. C. and Universal Current.



Little Giant Air Drills

Made in a wide variety of types and sizes for drilling, wood-boring, reaming, tapping, screw setting, nut and bolt tightening, etc.

Standard the world over, for riveting, chipping, calking, flue beading, scaling, etc.



Giant Semi-Diesel Oil Engines

Made in single and duplex types, sizes 12 to 200 H. P. Built also for operation on gas and steam.



Chicago Pneumatic Air Compressors

"The Compressor with the Simplate Valve." Made in capacities up to and including 5000 cu. ft. per min., for electric, steam, belt, oil, gas and gasoline drive. Over 500 distinct types and sizes, both stationary and portable.

TRADE MARK

Digitized by Google

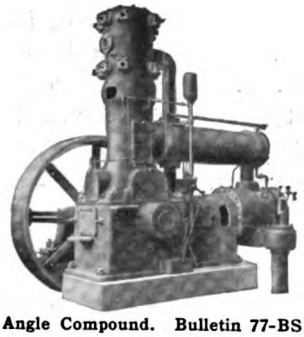
SULLIVAN MACHINERY COMPANY

120 So. MICHIGAN AVE., CHICAGO

BOSTON PITTSBURGH 30 CHURCH ST., NEW YORK ST. LOUIS SAN FRANCISCO

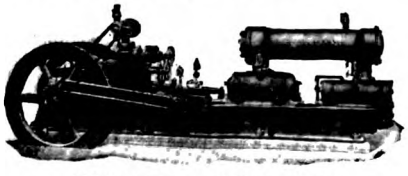
Sullivan Air Compressors, Gasoline Extraction Compressors, Air Lift Pumps, Rock Drills, Channelers, Hammer Drills, Drill Sharpeners, Coal Mining Machines, Quarrying Machinery, Diamond Core Drills, Core Drilling Contractors Forge Hammers, Drill Steel Furnaces, Vacuum Pumps

AIR COMPRESSORS:



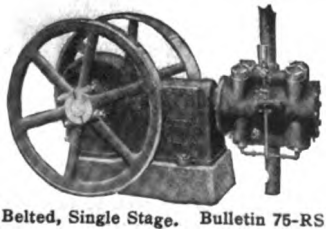
Angle Compound. Bulletin 77-BS

ANGLE-COMPOUND power driven compressors are economical of floor space and secure efficiency through exact balancing of reciprocating parts. For belt or direct connection; single or twin units, 400–2800 cu. ft., equipped with END-ROLLING FINGER VALVES, total closure unloading valve, with high pressure relief. Three pass, counter current intercoolers for highest efficiency.



"WB-3" Type. Bulletin 75-ES

Straight Line Steam-driven Compressors, single (WA-6) and two-stage (WB-3), are available in sizes to 1000 feet. Meyer and plain slide steam valves, "Wafer" air valves, abundant cooling area; strength and wearing qualities are emphasized.

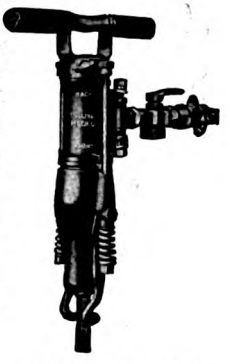


Belted, Single Stage. Bulletin 75-RS

Single Belted Compressors:

"WG-6," range from 60 to 470 feet capacity, are splash oiled and have "Wafer" valves. An inlet valve unloader saves power. Removable, die-cast, 4-part main bearings. Vacuum pumps and gasoline extraction compressors are also built, and portable, gasoline engine-driven units.

HAMMER DRILLS:



Rotators are all around, one-man drilling machines, weight 38 lbs., capacity, holes 6 to 14 feet deep. Automatic piston type rotation, steel retainer, hole-cleaning air jet and differential, independent valve are features. Seven types and two mountings to select from.

Bulletin 70-JS.

"DX-61" water-jet drifters are recommended for tunneling.

ROCK DRILLS of "Hy-speed," LITE-WEIGHT and submarine types are available, 2⅝ to 7 in. cylinder diameters.

AIR LIFT PUMPS:



The Sullivan Air Lift secures more, purer, cooler water from your wells, than other methods of pumping. Simplicity, reliability, sustained efficiency and central control are important features. Acids and chemical solutions handled efficiently on low submergences.

Bulletin 71-DS.

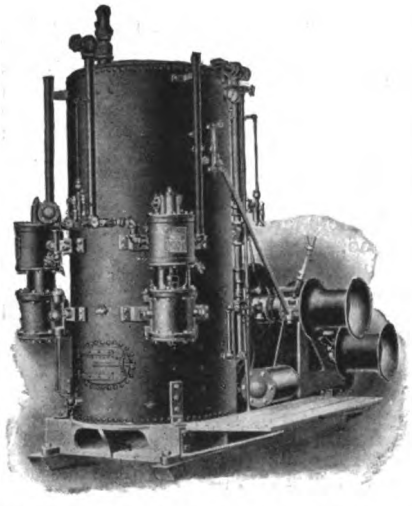
Digitized by Google

WESTINGHOUSE TRACTION BRAKE COMPANY

FACTORIES: WILMERDING, PA., AND MILWAUKEE, WIS.

Atlanta, Ga.	Columbus, O.	Los Angeles, Cal.	Pittsburgh, Pa.	St. Louis, Mo.
Boston, Mass.	Denver, Col.	Mexico City	San Francisco	St. Paul, Minn.
Chicago, Ill.	Houston, Tex.	New York, N. Y.	Seattle, Wash.	Washington, D. C.

Manufacturers of Westinghouse and National Steam-, Motor- and Belt-Driven Compressors and Accessories



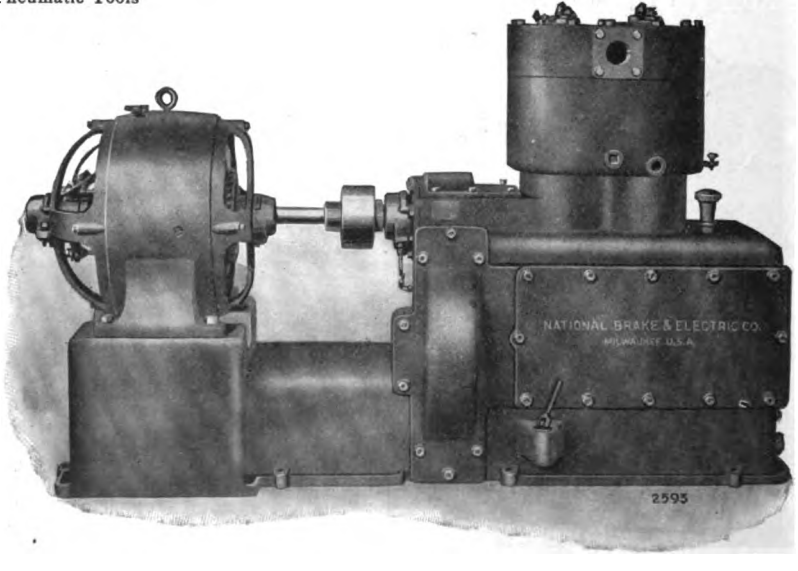
Two 9½" Westinghouse Railway Locomotive Air Compressors Installed on a Portable Skid Mounted Hoisting Engine, to Supply Air Pressure for Pneumatic Tools

The Westinghouse 9½" locomotive air compressor is a compact, rugged type of machine, designed for the rigors of railway use. It is especially adapted to rough usage by outside contractors and others requiring a dependable and self-contained machine of this character. Thousands are in industrial service today.

Send for Publication 9012.

Westinghouse motor-driven air compressors are compact, self-contained, direct connected, and ideally suited to service in all lines of industrial and commercial plants. Capacities, 4 cu. ft. to 550 cu. ft.

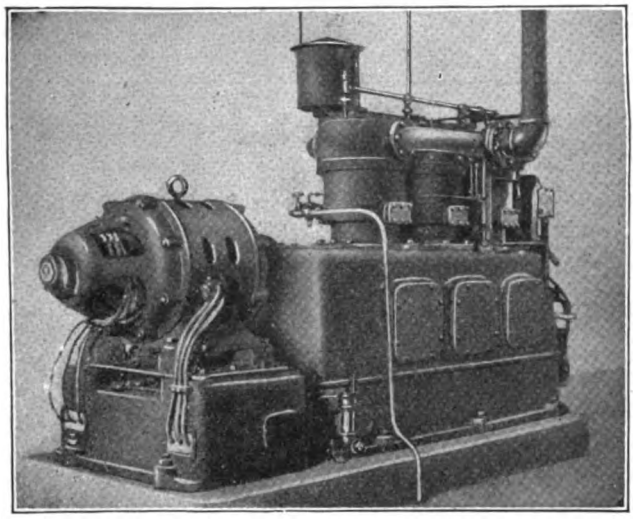
Send for Catalogue 9035.



Type E Water-Jacketed Compressor with Direct Current Motor. Displacement, 50 to 110 Cu. Ft. When Operating against 90 Lbs. Pressure. For Continuous Operation

Digitized by Google

WESTINGHOUSE TRACTION BRAKE CO. WILMERDING, PA.

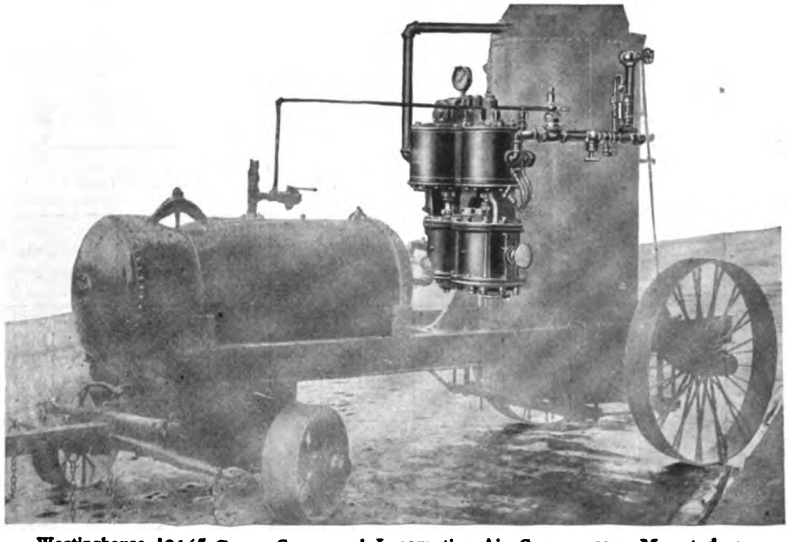


Westinghouse-National 3VS, Water-Jacketed, Direct Connected, Herring-Bone Gear and Pinion Automatic Control, Installed in a Prominent Chicago Foundry

The Westinghouse-National 3VS type of compressor is especially adapted to general factory and shop uses for the operation of all pneumatically operated devices such as pneumatic tools, air hoists, blacksmith forges, paint spraying, etc., is rugged, compact and of neat appearance.

The Westinghouse 10½" Cross Compound locomotive air compressor is exceedingly well suited to rough work of any contractor requiring compactness, reliability of action, low maintenance cost and minimum of attention. 551

Send for Publication 9033.



Westinghouse 10½" Cross Compound Locomotive Air Compressor, Mounted on Portable Truck and Used by New England Contractor for Operating Two Jack Hammers and Three ⅝" Tripod Drills

Digitized by Google

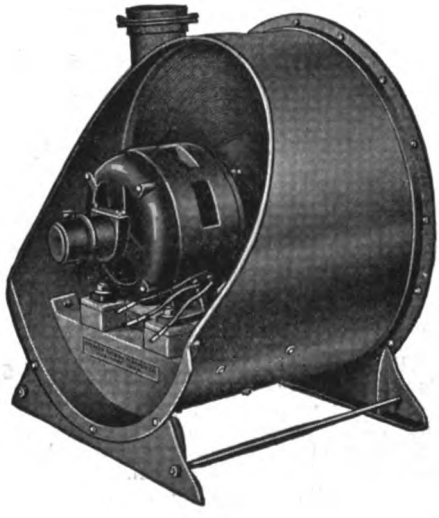
THE SPENCER TURBINE COMPANY

HARTFORD, CONN.

Turbine Blowers and Exhausters, Spencer Turbo Compressors, Spencer Steel Organ-blowers, Spencer Turbine Vacuum Cleaner Systems

SPENCER TURBO COMPRESSOR:

Slow speed, low velocity, wide clearance, multi-stage turbine.



552

The Turbo Compressor retains its efficiency permanently; no contacts or even close clearances, hence no chance for wear.

Direct connected, self-contained unit avoids necessity for belts, gears or chains, with their resultant losses and noises.

Constant pressure with no pulsations and no surging.

Current consumption inherently decreases in proportion to reduction of volume of air used, eliminating all auxiliary governors.

Write for Complete Bulletin.

TABLE OF PRESSURES AND CAPACITIES

1 Lb. Pressure		1½ Lb. Pressure		2 Lb. Pressure	
Catalog Number	Volume, cu. ft. per min.	Catalog Number	Vol., cu. ft. per min.	Catalog Number	Vol., cu. ft. per min.
1005	600	1507	675	2010	600
1007	1000	1510	900	2015	1000
1010	1300	1515	1350	2020	1300
1015	2000	1520	1800	2025	1650
1020	2700	1525	2250	2030	2000
1025	3350	1530	2700	2035	2350
1030	4000	1535	3150	2040	2700
1035	4700	1540	3600	2050	3350
1040	5400	1550	4500	2060	4000
1050	6750	1560	5400	2075	5000
1060	8100	1575	6750	20100	6700
1075	10000	15100	9000	20125	8100
				20150	10000

Digitized by Google

AMERICAN BLOWER COMPANY

DETROIT, MICH.

Manufacturers of Heating, Ventilating, Cooling, Purifying, Humidifying, Drying, Mechanical Draft and Blast Equipment; Vertical Self-Oiling Steam Engines, Steam Traps; Fans and Blowers for All Purposes

SYSTEM OF PURIFYING, COOLING AND HUMIDIFYING:

"Sirocco" TRADE MARK



For Purifying and Humidifying air in Schools, other Public and Semi-Public Buildings.

For Humidifying and Cooling air in Textile Mills, Food and Confectionery Plants, Printing Houses, and other Industrial Plants.

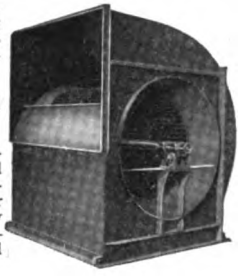
For Dehumidifying and Cooling in Candy Factories, Bakeries, Photo Film Drying Rooms, Blast Furnaces, Electric Generators, etc.

MULTI-BLADE FANS AND BLOWERS:

For Heating, Ventilating and Cooling in Public, Office, Industrial and Educational Buildings.

For Drying and Mechanical Draft.

Sirocco Multi-blade Fans will handle more air, consuming less power than the ordinary steel plate fan having twice the wheel diameter.



"ABC" EXHAUST FANS FOR EXHAUSTING AND CONVEYING SYSTEMS:

Exhaust shavings, dust and refuse from woodworking plants.

Take away the dust from emery grinders, buffing and polishing wheels.

Remove smoke and gases from forge fires.

Exhaust the dust from cement plants, flour mills and similar plants.

Remove steam and vapor from vats and kettles in breweries, packing houses, textile and rubber factories.

Elevate and convey cotton and wool in textile mills.

There is a size and type to meet any requirement.

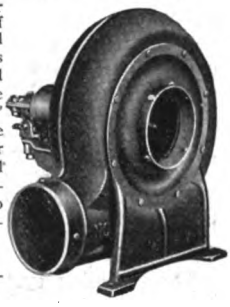
Capacity tables and complete data sent on request



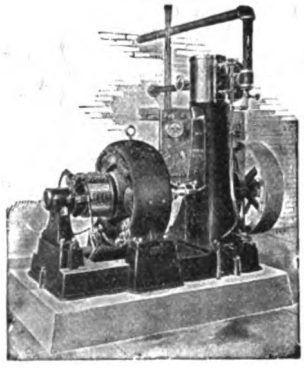
TYPE "V" UNIVERSAL BLOWERS AND EXHAUSTERS:

Four angles of discharge right-hand drive and four angles of discharge left-hand drive can be made from one Type "V" Universal Fan (aside from various angular discharges). For all Blowing and Exhausting work requiring up to four ounces pressure.

Built for either pulley or motor drive.



"ABC" VERTICAL SELF-OILING, STEAM ENGINES:



"VENTURA" DISC VENTILATING FAN:

For delivering large volumes of air at low pressure or against small resistances.

Low price—Small power consumption and inexpensive to install.

For ventilating rooms and buildings—Ventura, motor driven, ventilating fans, 650 C. F. M. to 17,500 C. F. M.

For ventilating small mines or at any mine where a disc fan can be used—engine or motor driven—from 12,000 C. F. M. to 100,000 C. F. M. resistance not to exceed 1" W. G.



Write for complete information.

Digitized by Google

THE ALLINGTON & CURTIS MFG. CO.

SAGINAW, MICH.
Incorporated 1888

FACTORIES:
1500 Holland Ave., SAGINAW, MICH. — 321 Rutherford Ave., BOSTON, MASS.

OFFICES:
CHICAGO, 565 Washington Blvd. — SAGINAW — BOSTON — PHILADELPHIA, 26 South 15th St.

Dust and Shavings Collecting Systems. Positive Long Distance Conveying Systems

PRODUCT:

We design, manufacture and install complete systems for: (1) Gathering shavings, sawdust, leather and metal dust from buffing and grinding operations, lint from textiles, fumes from paint sprays, etc. Also (2) Conveying hogged chips, shavings, etc., long distances; (3) Automatically feeding ground up wood waste to furnaces.

OPERATION:

The gathering system has pipes which lead from the refuse producing machines to a centrifugal fan and from the fan to a collector located above the point at which the material is to be deposited. The suction in each pipe is adjustable to meet that machine's requirements without waste. The fan is the slow-speed low-power type developed by us in 1905. The collector is the "back-pressure-proof" type (absolutely free from centrifugal resistance) which does not impose unnecessary resistance on the fan discharge. The materials are delivered to the collector by the air current produced by the fan, and from there drop by gravity, while the comparatively clean air escapes at the top.

554

The pneumatic conveyor system for ground pulp wood or for long distances (400 to 4,000 feet) includes a positive high pressure blower; a charger which receives the material by gravity and introduces it into the pipe from the blower against the pressure therein; the necessary pipe line and a collector at the end. The material is moved continuously and automatically.

The wood-waste stoker for sawdust, shavings, hogged chips, etc., has a non-arching tank to temporarily store the fuel as delivered at varying rates from the machines, and specially designed screw conveyors which deliver the material to the furnace at an absolutely uniform rate and without air current. The rate of feed is adjustable to suit the kind of fuel and the fire needed.

WHAT OUR SYSTEMS WILL DO:

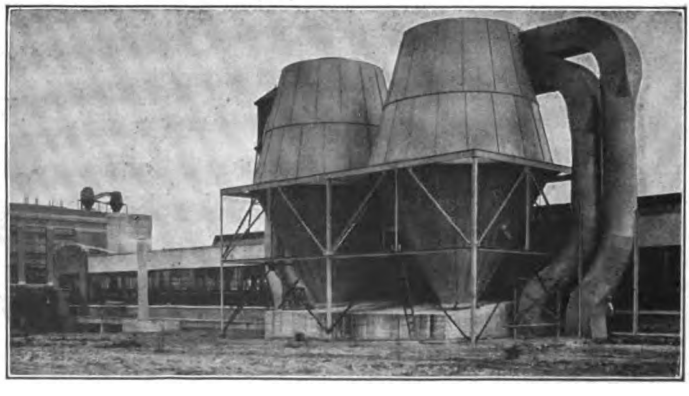
(1) Take refuse and dust from machines with less power than the ordinary system.
(2) Automatically handle heavier materials and a greater volume and longer distances than otherwise possible.
(3) Give the highest firing efficiency known for wood fuel.

SERVICE:

Each system is designed and manufactured to exactly meet the local conditions. Our engineers are at your disposal to submit a report on the improvements and power saving possible on a system already installed, or help you to provide in advance so that suitable installation will be possible in a new project.

No installation is too small to have our careful attention, but we have installed the largest systems in use in the United States, and have also furnished the apparatus for large installations in England and on the continent.

During thirty-three years' work in this special line, we have secured data and experience in connection with almost any material handling problem which can be solved with a pneumatic system.



Collectors of gathering systems and, in the background, collectors of conveyor systems. Chargers are located below the large collectors and pipes lead underground to the smaller collectors. The above at The St. Louis Mfg. Corpn. (General Motors Corpn.), St. Louis, Mo. (To form idea of size, note man at right.)

Digitized by Google

NEW YORK BLOWER COMPANY

FACTORIES

BUCYRUS, OHIO LAPORTE, IND.

MAIN OFFICE: CHICAGO, ILL.

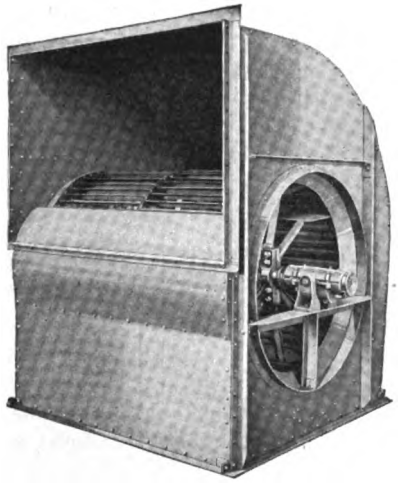
BRANCH OFFICES:

All Principal Cities

Sole Manufacturers of Seri-Vane Fans, Blowers, Exhausters, Peerless and Reversible Shaving Fans, Peerless Ventilators and Diffusers, Peerless Air Washers and Humidifiers

Seri-vane fans, blowers, etc., are made in such a wide variety of sizes and styles that their application is practically unlimited. For each and every engineering problem, we make a particular and distinctive size best suited for results to be obtained, space conditions, etc. While we can supply fans, blowers, air washers, etc., to fill any specifications, we prefer to have our engineering department examine and check all requirements before entering an order. By this careful and strict attention to all orders, we expect to keep up the quality of our product beyond the reach of competitors.

SERI-VANE FANS AND BLOWERS:



It is a well-known and accepted fact that the many blade fans are far superior and efficient to the old type paddle wheel fans. It was only after extended and thorough investigations and tests that we placed our well known **SERI-VANE FANS** on the market. By a scientific construction of not only the fan wheel but the housing also, we have been able to market a product so superior to the others that the results obtained are conceded to be little short of phenomenal.

Our Catalog No. 70 gives a complete description of this type of fans with certain valuable tables and engineering information. All our fans are constructed throughout of the best material obtainable and, size for size, are the heaviest fan on the market. We would not cheapen the fan by using lighter material to reduce the selling price.

PEERLESS AIR WASHERS AND HUMIDIFIERS:

We make the plain air washers as used in the ordinary ventilation system for Schools, Churches, etc., but also the more complex washers, humidifiers and dehumidifiers that are used in so many industries, as the manufacturing of Sausage, Gun Powders, Rubber, Soap, Leather, Textiles, etc.

555

We can offer valuable suggestions and remedies for each manufacturing problem that may arise. The saving and economy effected is always greater than the first cost.

We make fans, blowers and other allied products for any use where air is handled such as Heating and Ventilation, Forced and Induced Draft, Gas and Forge Blowers, Waste Heat Drying, Shaving and Blow Pipe work, etc.

For each particular subject we have prepared an invaluable treatise which will be sent upon request.

Our Engineering Department is ready at all times to offer suggestions and prepare plans and specifications illustrating fully their solution of any problem at stake.

Please communicate with our nearest office for immediate attention.

GUARANTEE:

We guarantee the product of our manufacture for five years from date shipped; all claims of any kind and description are cheerfully rectified without any quibbling. The customer must be satisfied.

Digitized by Google

CLARAGE FAN COMPANY

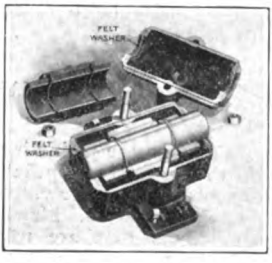
MAIN OFFICE AND WORKS: KALAMAZOO, MICHIGAN

BRANCHES AND AGENCIES

BALTIMORE, MD., McComas and Race Streets
BOSTON, MASS., 120 Milk Street
CHICAGO, ILL., 111 West Washington Street
CLEVELAND, OHIO, 511 Meriam Building
DETROIT, MICH., 315 Murphy Bldg.
MINNEAPOLIS, MINN., 305 Metropolitan Bank Bldg.
NEW YORK, N. Y., 149 Broadway
PITTSBURGH, PA., 206 Wood Street
ROCHESTER, N Y., 104 East Avenue
ST. LOUIS, MO., 2211 Olive Street
PHILADELPHIA, PA., 320 Commercial Trust Bldg.

CLARAGE STANDARD BEARINGS:

In any centrifugal machine the point of greatest wear occurs in the bearings. For this reason all Clarage Fan Apparatus is equipped with bearings especially protected against wear. Notice felt washers fitting snugly around shaft at each end of bearing case. These are the protection—they keep dirt out and oil in. Standard Bearings are self-oiling, and self-aligning in all directions. S.K.F. ball bearings can be furnished, if desired.

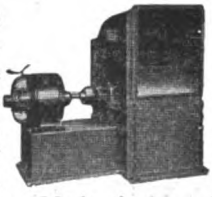


REVERSIBLE AND ADJUSTABLE FEATURES:

All Clarage Fans and Blowers, in the smaller sizes with exception of ¾ housed fans and Special Pressure Blowers, are reversible and adjustable for 16 different directions of discharge.

CLARAGE MULTIBLADE FANS:

For heating and ventilating installations these fans are unusually efficient and operate quietly. Built sufficiently strong for 5 in. pressure, water gage. Made single and double inlet, single width; and double inlet, double width.



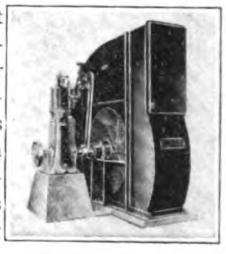
Sizes Nos. ¾ to 8, inc.; numbers also indicate approximate diameter of wheel in feet. Capacities up to 201,000 cu. ft. of air per minute.



These fans are also used for removing smoke, dust or noxious gases. Can be motor, engine or turbine driven by belt or direct connected.

CLARAGE STEEL PLATE FANS:

Built primarily for mechanical draft work, although adapted for any duty where volumes of air are handled at pressures not exceeding 6 in. For induced draft special construction is necessary; fan housings are heavier and wheel is overhung. Bearing next to fan is water-jacketed so that it will keep cool. Made ¾ or full housed in sizes Nos. 25 to 300, single or double inlet. Motor, engine or turbine driven, by belt or direct connected.



CLARAGE EXHAUST FANS:

Standard "SP" Exhausters are built very heavy and rugged. Used for elevating and conveying sawdust, shavings, and blocks in lumber mills; dust and lint from

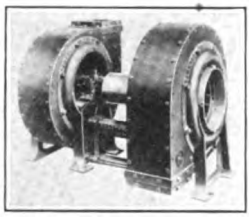


Digitized by Google

CLARAGE FAN COMPANY — KALAMAZOO, MICH.

polishing and emery wheels; cotton, wool or grain; smoke and vapors. Particularly suitable, however, where heavy materials pass through fan, due to strength and rigidity of construction. Built in sizes Nos. 25 to 160, single and double. Belt or direct motor driven.

Style "C" Exhausters have high efficiency, Multiblade wheels which run at lower speeds and save power. Used anywhere if the materials do not pass directly through fan. Sizes Nos. 30 to 60. Belt or direct motor driven.



CLARAGE PRESSURE BLOWERS:



Style "C" Pressure Blowers are suited for operation at moderately high speeds and against pressures up to 12 ozs. water gage. Multiblade wheels with peculiarly shaped blades make Style "C" Blowers exceedingly efficient. Adapted for oil furnaces, foundry cupolas and forges. Sizes Nos. 30 to 60. Belt or direct motor driven.



Clarage Type "P" Blowers are designed for work against high pressures (8 to 30 oz.) and for direct connection to standard speed electric motors. First cost is about ⅓ of rotary blower; maintenance cost is negligible; and satisfactory performance guaranteed.

CLARAGE VERTICAL, SELF OILING AND FULLY ENCLOSED STEAM ENGINES:



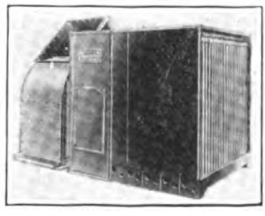
Adapted for direct connection to fans, blowers, pumps, motor generators, etc. Built in four classes to operate on steam pressures 10 to 250 lbs. and develop up to 85 H.P.

CLARAGE-SPRACO AIR WASHERS:

The bronze, center-jet nozzle in these air washers is simple in design, yet produces a spray entirely different and superior to other types of nozzles. On account of special nozzles air can be handled at maximum velocity on 720 ft. per min. This velocity is higher than usual practice and results in a more compact apparatus than otherwise possible. Washers, of course, furnished to handle air at 500 ft. per min., if desired. Sizes 2,800 to 103,000 cu. ft. of air per min.

OTHER CLARAGE PRODUCTS:

In connection with our fans we also furnish Vento and Pipe Coil Heaters, Engines, Motors or any accessories necessary or desirable for complete fan or blower installations.



Charge Multiblade Fan and Pipe Coil Heater

CO-OPERATIVE SERVICE:

The Engineering Department of this company has compiled elaborate data covering capacities, etc., for every Clarage product. The department will gladly co-operate with engineers in every way possible. This material will be of value in determining requirements. We suggest that you direct your inquiries to the Clarage Branch Office nearest you (*see top of opposite page*).

Digitized by Google

B. F. PERKINS & SON, INC.

Established 1873

HOLYOKE, MASS.

Ventilating and Exhaust Fans—Paper Mill Machinery—Embossing Machines. The Mullen Tester for Paper, Textiles, Boxboards and Knit-goods. Size Pumps—Rag-cutters—Calendar Rolls of Cotton, Paper or Husk

PERKINS VENTILATING AND EXHAUST FANS:

Have a combination of especially desirable features possessed by no other fan. Some of their distinctive points are:

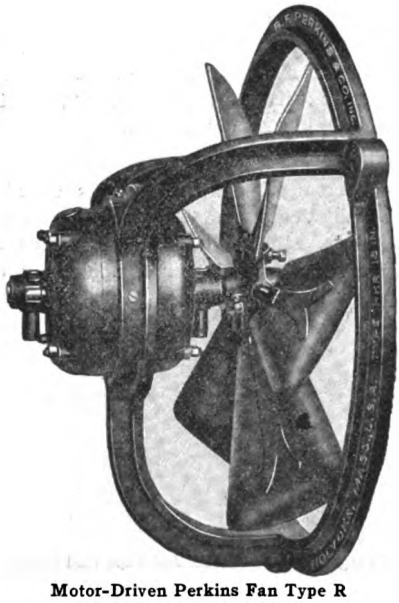
Adjustable and reversible blades.

Variable capacity.

Positive lubrication.

Ball-bearing thrusts.

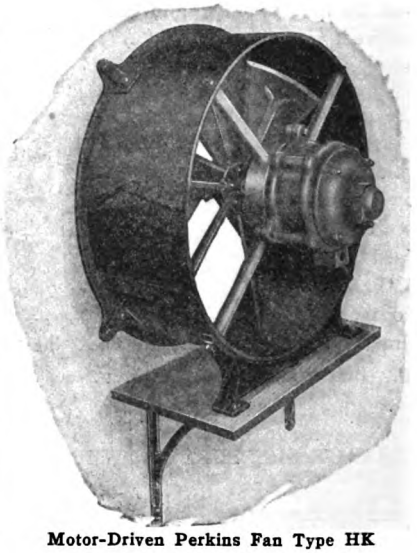
Rigid all-steel construction.



Motor-Driven Perkins Fan Type R

Made in belt-driven type or direct-connected motor-driven type—vertical or horizontal form—in sizes from eighteen inches to twelve feet in diameter.

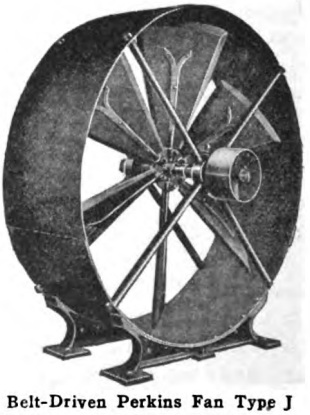
We maintain a Service Department for your convenience.



Motor-Driven Perkins Fan Type HK

OUR GUARANTEE:

We guarantee that Perkins Fans will displace more air under like working conditions and power consumption than any other fan of their type made, *or we will refund the price of the fan.*



Belt-Driven Perkins Fan Type J

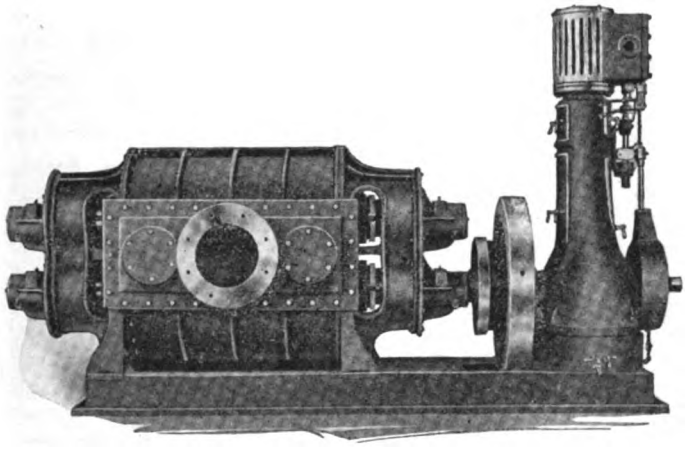
Digitized by Google

WILBRAHAM-GREEN BLOWER CO.

Established 1854

POTTSTOWN, PA.

Sole Manufacturers of Green Patented Rotary Positive Pressure Blowers, Gas Exhausters and Huntoon Patented Gas Governors



No. 7 Gas Exhauster with 7 x 8 Troy Enclosed Vertical Engine

Our products are known to the trade as

"THE OLD RELIABLE."

ROTARY POSITIVE PRESSURE BLOWER:

Made in 18 standard sizes up to 18,000 cu. ft. of free air per minute and up to 5 lbs. pressure. Larger sizes built to order. *Send for Bulletin No. 11.*

ROTARY POSITIVE PRESSURE GAS EXHAUSTER:

Modern design equipped with ring oiling bearings and stuffing boxes that will not leak. Are built in 19 standard sizes up to 17,000 cu. ft. of free air per minute. Larger sizes built to order. *Send for Bulletin No. 12.*

ROTARY POSITIVE PRESSURE SMELTER BLOWER:

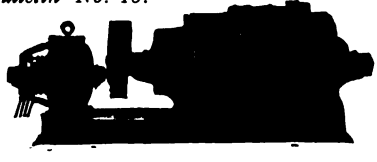
For smelter work let us give you facts and figures on our present two impeller type smelter blower. Made in 10 standard sizes up to 19,000 cu. ft. of free air per minute and up to 40 oz. pressure. Larger sizes built to order. *Send for Bulletin No. 13.*

CYCLOIDAL VACUUM PUMPS:

For flat suction boxes. Built for a steady high vacuum and a long life. Made in 11 standard sizes up to 700 cu. ft. of free air per minute. *Send for Bulletin No. 15.*

ROTARY POSITIVE PRESSURE BLOWER:

The most modern way to aerate raw water in ice plants, etc. Equipped with belt, reduction gearing or noiseless chain drive. Made in 9 standard sizes up to 600 cu. ft. of free air per minute at 3 lbs. Is strong enough for 5 lbs. pressure. Larger sizes built to order. *Send for Bulletin No. 16.*



Motor Driven Blower

Regular Foundry Blowers both Motor and Pulley Driven a specialty.
Built in all sizes.

If you desire to deliver air or gas against pressures from 1 to 5 lbs. for any purpose whatever, we believe it will be to your advantage to allow us to quote you.

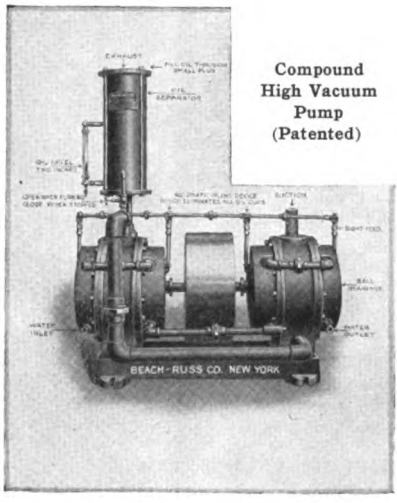
Digitized by Google

BEACH-RUSS COMPANY

GENERAL OFFICES: 50H CHURCH ST., NEW YORK CITY

TELEPHONES: Cortland 54, 55, and 56

Manufacturers of Rotary Air Compressors, High Vacuum Pumps, Acid-Resisting Pumps, Heavy Liquid Pumps, Positive Pressure Blowers, Rotary Air Compressors, Pumps for Heating Plants, Filter Presses, etc.



Compound High Vacuum Pump (Patented)

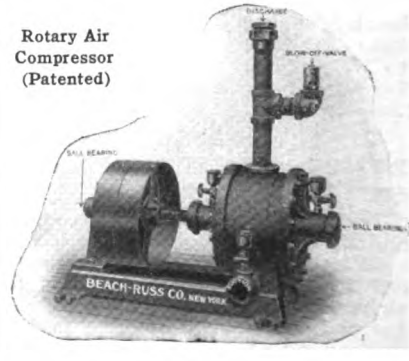
Compound High Duty Vacuum Pumps: Guaranteed to exhaust to within $^1/_{10}$ in. (2.5 mm.) of Barometer. The Beach-Russ Company has been manufacturing patented rotary vacuum pumps for twenty-four years. These pumps were awarded the gold medal at the Panama-Pacific Exposition. They are simple in construction and silent in operation; have no gears, valves or complicated parts; take up little room; and have low power consumption per unit volume of air displaced. Regularly manufactured in ten standard sizes ranging in capacity from 6 to 263 cu. ft. of air per minute.

Single Stage Vacuum Pumps: These pumps may be used for all purposes where a vacuum up to 29 in. is required. They are simple in construction—silent in operation and are equipped with ball bearings. Made in twelve standard sizes ranging in capacity from 6 to 1000 cu. ft. per minute.

Heavy Liquid Pumps: These pumps are designed for pumping coal-tar products, oil greases, paints, varnish, and other liquids of high viscosity. They are of extra heavy construction and will stand all kinds of abuse. Regularly built in five sizes with capacities ranging from 50 to 500 gals. per min.

Acid-Resisting Pumps: Can be obtained in Hard Lead and Antimony Alloy, Monel Metal, Bronze and Aluminum. Capacities 20 to 200 gals. per min. Thru bolt construction.

Rotary Air Compressors (Patented): These compressors are for all purposes requiring moderate air pressure—gas and oil furnaces, agitating liquids, atomizing, glass blowing, laundries, etc. They give a direct non-pulsating supply of air without the use of air receivers; have no complicated parts; and are equipped with ball bearings throughout, thereby reducing power consumption to the minimum. Absolutely noiseless in operation. Twelve standard sizes ranging from 6 to 100 cu. ft. per min. in capacity. Ball bearing construction..



Rotary Air Compressor (Patented)

Digitized by Google

LAMMERT & MANN CO.

Engineers and Machinists

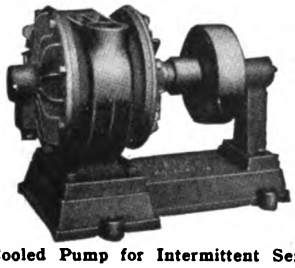
WOOD AND WALNUT STS., CHICAGO, ILL.

Lammert Rotary Dry Vacuum Pumps and Pressure Blowers

LAMMERT VACUUM PUMPS:

Pistonless—Valveless—Rotary

Made in a variety of types and sizes to meet the numerous dry vacuum requirements and also adapted to pressure work up to 20 pounds.



Air-Cooled Pump for Intermittent Service

Types and Sizes:

Lammert pumps may be had air- or water-cooled, belt driven or equipped with reduction gears and connected direct to motor. The air-cooled pumps are for intermittent service and will develop a 27-inch vacuum at sea level. Size numbers 1-2-3-4, with capacities of 3½, 7, 14 and 24½ cu. ft. of free air per minute, respectively. This type is equipped with the capillary system of oiling and will operate for a week without refilling the oil cups.

The water-cooled pumps for continuous service will easily maintain a 28-inch vacuum at sea level and are made in sizes ranging from 1 to 10, inclusive, with capacities from 3½ cu. ft. to 700 cu. ft. of free air per minute.

These pumps arranged in tandem for high duty are guaranteed to maintain a vacuum within ½ inch of the barometer and are tested to as high as $^1/_{10}$ inch of the barometer. The larger water-cooled pumps are equipped with automatic oiling and oil reclaiming system which cuts the operating attention to the absolute minimum. This system may also be applied to the small pumps.

Uses:

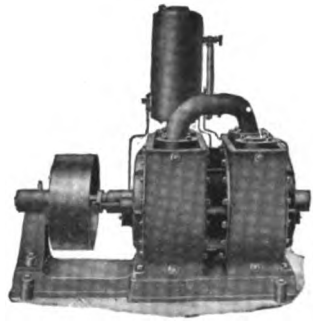
Lammert Vacuum Pumps—Used for canning, preserving, milking, in chemical laboratories and for many varied special purposes where high dry vacuum is desired. Also adapted to the priming of centrifugal pumps to which we attach our automatic control. Lammert Pressure Pumps—Used for agitating liquids, cleaning generators, blowers for machine shops or any service where pressure up to 20 pounds can be used.

Advantages:

Lammert Pumps are simple, compact and operate without noise or vibration. There are no valves, cranks or connecting rods to wear or give trouble. All parts are standard and interchangeable and each part is rigidly inspected and every pump is tested to its full rated capacity.

561

Every Lammert pump carries a full guarantee against faulty material or workmanship.



Water-Cooled Pump, Tandem Type for High Duty Continuous Service

We have been making vacuum pumps for 20 years and some of the largest concerns in America and abroad are using them with absolute satisfaction. Some of our first pumps are in daily operation without repairs.

Send for catalog No. P-3C giving full particulars.

SEE OUR ADVERTISEMENT MECHANICAL ENGINEERING THE JOURNAL OF THE A.S.M.E.

Digitized by Google

AMERICAN STEAM PUMP CO.

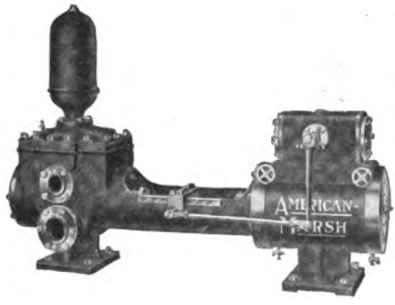
BATTLE CREEK, MICH.

NEW YORK OFFICE
17 Battery Place

CHICAGO OFFICE
1220–21 Monadnock Block

Manufacturers of American-Marsh Steam and Power Driven Pumping Machinery, Centrifugal Pumps and Air Compressors, Marsh Deep Well Engines

AMERICAN-MARSH BOILER FEED PUMPS:



American-Marsh Boiler Feed Pumps are regularly furnished with bronze removable water cylinder bushings, bronze piston rods and bronze valve seats, bolts and springs. The steam valve is of the balanced piston type, with semi-rotative disc auxiliary valve. There are no internal stuffing boxes, no tappets or slide valves. Heavy in construction and consequently the cost of upkeep is unusually low.

Bulletin No. 28.

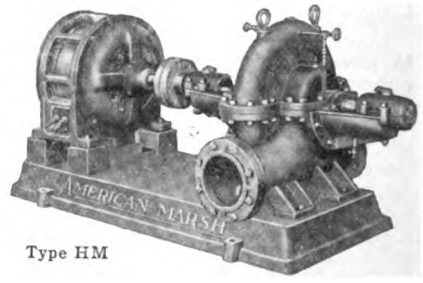
AMERICAN-MARSH VACUUM PUMPS:



American-Marsh Vacuum Pumps have long been considered as standard by heating contractors. The steam mechanism is especially adapted for vacuum service, giving a smooth steady action which is essential for this class of work. This type is made in both steam and power driven types suitable for handling up to 200,000 square feet of radiation.

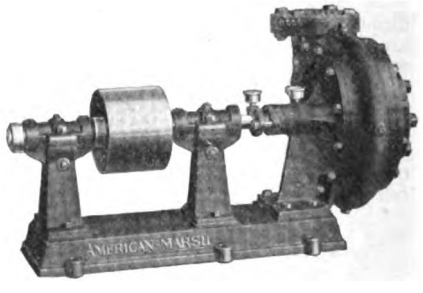
Bulletin No. 24.

AMERICAN-MARSH CENTRIFUGAL PUMPS:



Type HM

American-Marsh Centrifugal Pumps are made in both the single and two stage patterns, single and double suction, solid and split case. Capacities range from 5 to 5000 gallons per minute. All types are arranged for direct connection to motors or turbines. They are regularly furnished with closed type of runner unless the service demands the open pattern.



Type A Belt Driven

Pump Number	Size Delivery	Size Suction	Gallons per Minute			W't. Iron
			Min.	Nor.	Max.	
¾	¾	1	5	10	15	25
1	1	1¼	15	25	35	45
1½	1½	2	35	55	75	110
2	2	2½	75	100	125	150
2½	2½	3	100	150	200	200
3	3	4	180	225	300	240
3½	3½	4½	275	325	425	310
4	4	5	300	425	525	380
5	5	6	500	700	900	525
6	6	8	700	925	1200	650
8	8	10	1200	1800	2200	1100
10	10	12	2400	3000	3400	1400
12	12	14	3400	4500	5200	2100

Digitized by Google

BLACKMER ROTARY PUMP CO.

PETOSKEY, MICH.

Manufacturer of Blackmer Rotary Pumps

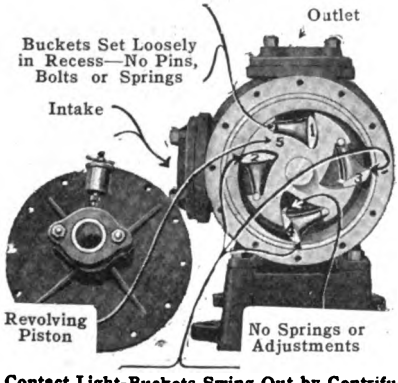
DISTRICT OFFICES

85 Murray St., - - - New York, N. Y.
711 Ferguson Bldg., - - - - Pittsburgh, Pa.
727 Mason Bldg., - - - - - - Houston, Tex.
203 Williams Bldg., - - San Francisco, Calif.
1119 Real Estate Trust Bldg., Philadelphia, Pa.
1347 Book Bldg., - - - - - - Detroit, Mich.
1146 Plymouth Bldg., - - Minneapolis, Minn.
315 Old Colony Bldg., - - - - Chicago, Ill.
315 Reserve Bank Bldg., - - Kansas City, Mo.

Black Mer Maid

Trade Mark Reg. U. S. Pat. Office

THE BLACKMER ROTARY PUMP:



Contact Light-Buckets Swing Out by Centrifugal Force Taking up Wear Automatically

The Blackmer Rotary Pump will pump water, oil, gasoline, kerosene, wood alcohol, turpentine, milk, cream, catsup, soap, tan liquor, ammonia, paint and other liquids and chemicals more efficiently than any piston pump. It will deliver greater volume in a continuous flow with less power.

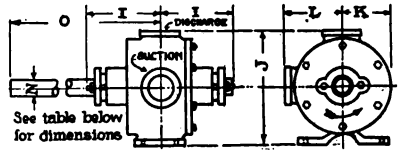
It is manufactured for rugged service. The design is simple, the materials are of the best tested quality and the workmanship is thoroughly inspected to insure standard perfect parts. Any wear in the balanced buckets is automatically taken up. When parts require replacement they are obtainable quickly from stock and they fit, for Blackmer Rotary Pumps are made with interchangeable parts, costing you the same as a repair part or as when a part of the new pump; no higher.

The Sanitary pumps for foodstuffs can be disassembled, cleaned and reassembled for use in a few minutes. They are made in iron or bronze, belt or direct connected motor drive.

Blackmer Regular type pumps are made belt, motor, gasoline engine and steam engine drive, as single pumps or units up to six.

563

We want you to have our complete catalogue in your files, so send us a request. We also want the opportunity to offer you some interesting pump performance records for your next pump installation.



SPECIFICATIONS

	Pump No.	Pipe Connections	Gal. per Min.	Suction Lift, Feet	Max Press, Lbs.	Floor Space, Inches	DIMENSIONS IN INCHES I	J	K	L	N	O
Regular Pumps	0	½	6½	2	75	4x12	3	3¾	2	2	½	9
	1	¾	12	10	75	10x21	4¾	5¾	3	3¼	5/8	16
	2	1	20	10	75	10x21	5¼	5¾	3	3¼	¾	16
	3	1½	35	12	75	12x31	5½	8	3½	4	1	23½
	4	2	50	12	75	12x31	6½	8¼	3½	4½	1	23½
	6	2½	100	15	75	16x40	10	10¾	5	5¾	1 1/16	30½
	6 spl	2	100	15	40	14x36	8½	11	5	5¼	1 1/16	27¾
	8	3½	200	18	75	18x52	11½	14	6½	7½	1 1/16	38½
	10	5	350	20	75	3x80	17	18½	9	8½	2 3/16	55
	12	6	500	20	75	36x90	22	24	10	12	2 1/16	64
Sanitary Pumps	11	1	4½	1½	40	4x12						
	01	1	16	8	40	8x16						
	02	1½	30	10	40	10x23						
	03	2	80	12	40	12x33						
Hand Pumps	9	1	12	5								
	5	1½	15	5								
	7	2	25	8								

Digitized by Google

INGERSOLL-RAND COMPANY

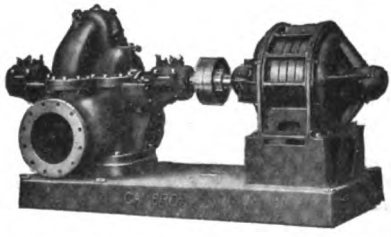
A. S. CAMERON STEAM PUMP WORKS

11 BROADWAY, NEW YORK

"OFFICES EVERYWHERE"

Manufacturers of Pumping Machinery

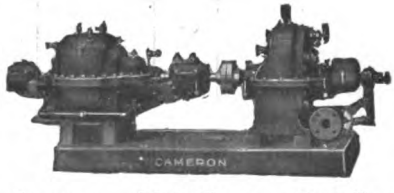
CAMERON DOUBLE SUCTION VOLUTE PUMPS:



Cameron Double Suction Volute Pumps are built for general service work. Their capacities range from 75 to 21,000 G. P. M. for heads from 10 to 200 feet. They can be direct-connected to electric motor or steam turbine or can be arranged to suit any motive power. These pumps have enclosed impellers with casings horizontally split, which affords easy access to interior working parts without disturbing pipe connection, or pump alignment. All parts are manufactured of the best materials, carefully machined and rigidly inspected. No pump leaves the shop test pits until it has been made to meet the exact requirements for which the pump is sold.

Described in Bulletin No. 7350.

CAMERON MULTI-STAGE CENTRIFUGAL PUMPS:



Cameron Multi-Stage Centrifugal Pumps are built with capacities from 75 to 11,000 G. P. M. and for heads from 120 to 800 feet. These pumps are available up to five stages in a single unit. Where a greater number of stages is desired, it is advisable to accomplish this by series arrangement, consisting of two pumps of three, four, or five stages each, so arranged that half the pressure is generated by the first group of stages and the remaining pressure by the group in the second pump.

Some of the special features of Cameron Multi-Stage Pumps are: double wearing rings placed about the impeller hubs which keep the joints tight at all times; bearings of self-aligning type and mounted in horizontally split housings; standardization of the Kingsbury thrust bearing or special hydraulic balancing device, reducing thrust to a minimum.

Cameron Multi-Stage Pumps are arranged to suit any kind of motive power.

Write for Bulletin No. 7351.

CAMERON DIRECT-ACTING STEAM PUMPS:



Cameron Direct-Acting Piston Plunger Pumps are built for general service work not requiring too high a suction lift. Whenever a direct-acting steam pump can be used there is nothing to equal the Cameron for durability, accessibility, smooth operation and low upkeep cost.

Numerous instances are brought to our attention of Cameron Pumps which have been in service for thirty, forty, or even fifty years and still giving satisfactory service.

Cameron Direct-Acting Pumps are built with capacities from 12 to 610 G. P. M.

Write for Bulletin No. 7304.

Digitized by Google

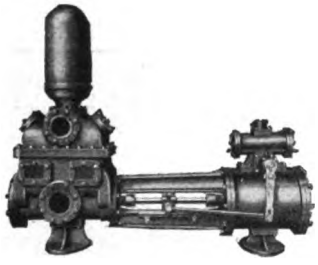
M. T. DAVIDSON COMPANY

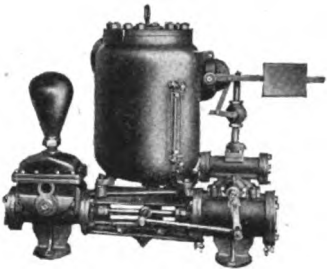
MAIN SALES OFFICE: 154 NASSAU STREET, NEW YORK

WORKS: 43–53 KEAP STREET, BROOKLYN, N. Y.

BOSTON: 135 Oliver St.
WASHINGTON, D. C.: 817 Albee Building
PHILADELPHIA: 147 N. 7th St.
ROCHESTER: 1224 Granite Bldg

Manufacturers of "Davidson" Economical High Grade Simplex Pumps





SPECIFICATIONS OF "DAVIDSON" PUMPS

Boiler Feed Pumps

Steam Cylinder	Water Cylinder	Stroke Inches	Gallons per Stroke	Boiler H. P. Pump Will Supply	Steam Pipe	Exhaust Pipe	Suction Pipe	Discharge Pipe
5	3¼	8	.28	125	½	¾	2	1½
6	4	8	.435	175	¾	1	2½	2
6	4	10	.54	225	¾	1	2½	2
7½	5	10	.85	350	¾	1	3	2½
8	5¼	12	1.12	500	1	1¼	3	2½
9	6	12	1.47	600	1	1¼	4	3
10	7	12	2.00	875	1	1½	5	4
12	8¼	12	2.77	1,150	1½	2	6	5
12	8¼	14	3.23	1,400	1½	2	6	5
14	9¼	16	4.66	2,000	1½	2	7	6
14	10	16	5.44	2,350	1½	2	8	7
16	10½	18	6.74	3,000	2	2½	8	7

Automatic Pumps and Receivers

Capacities of pumps given below are based on condensation of ½ lb. of steam per square foot per hour

Steam Cylinder	Water Cylinder	Stroke Inches	Sq. Ft. Rad. Sur. Pump Will Drain	Steam to Pump	Discharge from Pump
3	2	4	2,500	¼	1
3½	2¼	4	3,500	⅜	1
4	2½	6	7,000	⅜	1¼
4½	3	6	10,000	½	1½
5	3¼	8	15,000	½	1½
6	4	8	23,000	¾	2
6	4	10	30,000	¾	2
7½	5	10	45,000	¾	2½
8	5¼	12	55,000	1	2½

Vacuum Pumps

Steam Cylinder	Vac. Cylinder	Stroke Inches	Steam Pipe	Exhaust Pipe	Suction Pipe	Discharge Pipe	Floor Space Required	Sq. Ft. Surface in Vac. Heating Sys. Pump Will Care for
3½	4	4	⅜	½	1½	1½	Blue Print Plan, Giving Dimensions, Furnished on Application	1,600
3½	4	6	⅜	½	2	2		2,500
4	5	6	⅜	½	2	2		3,750
4½	6	6	½	¾	2½	2½		5,000
4½	6	8	½	¾	3	3		6,500
5	7	8	½	¾	3½	3½		9,500
5	7	10	½	¾	3½	3½		12,000
6	8	10	¾	1	3½	3½		16,000
6	8	12	¾	1	3½	3½		20,000
6	9	12	¾	1	4	4		25,000
7	9	12	¾	1	4	4		25,000
8	10	12	1	1¼	5	5		30,000
9	12	12	1	1¼	5	5		40,000
10	14	14	1	1½	6	6		60,000

Dry vacuum service pumps furnished with water seal on vacuum cylinder stuffing box.

Digitized by Google

DAYTON-DOWD COMPANY

MAIN OFFICE AND WORKS: QUINCY, ILLINOIS

Manufacturers of Centrifugal Pumps

BRANCHES

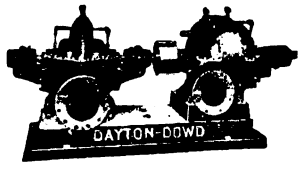
90 West Street, NEW YORK
1304 Pennsylvania Bldg., PHILADELPHIA, PA.
Box 1896, RICHMOND, VA.
721 Whitney Central Bldg., NEW ORLEANS
Sprado Engineering Co., LOS ANGELES, CAL.
30 No. Michigan Blvd., CHICAGO, ILL.
923 Hurt Building, ATLANTA, GA.
614 National Bldg., CLEVELAND, O.
2211 Olive Street, ST. LOUIS, MO.
David Whitney Bldg., DETROIT
Isaac Hardeman, CHARLOTTE, N. C.

DAYTON-DOWD DOUBLE-SUCTION CENTRIFUGAL PUMPS, SINGLE-STAGE:



Type CS pumps are built in sizes from 1½" to 36" discharge for all classes of pumping service. Drooping power characteristic prevents overloading motive power. The casings are divided horizontally—and pumps bronze fitted—parts interchangeable. A high grade efficient pumping unit. *Ask for bulletin No. 244-E.*

566



Type CS 10" Turbine Driven Pump

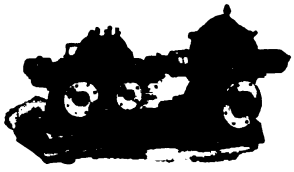
DAYTON-DOWD APPROVED UNDERWRITERS' CENTRIFUGAL FIRE PUMPS:



1000 Gallon Fire Pump with Complete Fittings

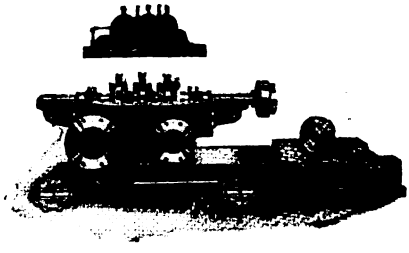
Type CSU centrifugal fire pumps are approved by all Fire Underwriters' Associations—built to meet their specifications. Sizes 500 Gallon—750 Gallon—1000 Gallon and 1500 Gallon. Arranged for motor, steam turbine or gas engine drive. A large number of installations prove their efficiency for fire protection. Estimates furnished on complete installations. *Bulletin 246-E.*

DAYTON-DOWD SINGLE-SUCTION AUTOMATICALLY BALANCED MULTI-STAGE PUMPS:



Type CSU 3"-3 Stage Turbine Driven Boiler Feed Pump

For all high pressure pumping service, the type CSU is specified. A thoroughly reliable and efficient unit. Axial thrust is controlled by means of disc balancing device, automatic in operation. Unexcelled for boiler feeding, mine station, elevator and other high pressure pumping service. Modern design and mechanical excellence both checked by running tests assure a dependable pump. *Ask for bulletin No. 242-E.*



Type CSU 6"-3 Stage with Cover Raised

TYPE SS SINGLE-SUCTION, SINGLE-STAGE PUMPS:

This type is furnished in sizes from 1" to 6" discharge. Equipped with open type impeller for heads not exceeding 120 ft. (Not illustrated.)

ENGINEERING SERVICE:

An experience of 20 years in solving pumping problems is at your disposal for selecting pumps to meet your particular requirements.

SEE OUR ADVT. IN MECHANICAL ENGINEERING THE JOURNAL OF THE A.S.M.E.

Digitized by Google

THE DEMING COMPANY

SALEM, OHIO, U. S. A.

NEW YORK OFFICE AND STOCK: 152 Chambers Street
Distributing Houses in All Principal Cities

Manufacturers of Hand and Power Pumps for All Uses

DEMING POWER PUMPS:

DEMING Power Pumps are made in such a variety of styles and sizes that their range of application is practically unlimited where belts, water wheels, electric motors, or steam, gas or gasoline engines are available sources of power. The types include Single- and Double-Acting Triplex Pumps for various services, Deep Well Power Working Heads, Artesian Well Cylinders, Rotary and Centrifugal pumps. They are well built upon such lines as to insure great durability, efficiency, reliability, ease of operation and low cost of maintenance.

Deming Single-Acting Triplex Plunger Pump:

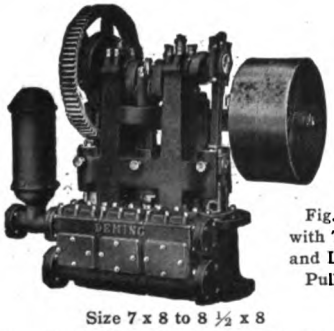


Fig. 50 with Tight and Loose Pulleys

Size 7 x 8 to 8 ½ x 8

Fig. 50 (illustrated), Single-Acting Triplex Pump, is designed for water works, hydraulic elevator service, boiler feed, pulp grinders and general water supply.

Deming Triplex Pumps embody the principle of the three-throw crankshaft, with the crank pins at an angle of 120 degrees with each other, by which ar-

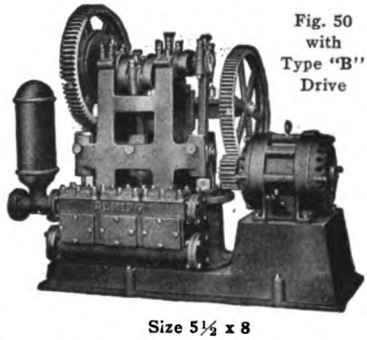


Fig. 50 with Type "B" Drive

Size 5½ x 8

rangement the strokes follow and overlap one another. This results in a continuous and uniform action upon the fluid being pumped, and insures an easy flow through the delivery pipe, with a corresponding high degree of efficiency in the operation of the pump.

All of our triplex pumps, whether of low service, medium or heavy pressure types, have the plungers with crossheads outside guided, thereby relieving the stuffing-box glands of lateral pressure due to the side thrust of the connecting rods.

Individual Bulletins of Deming Power Pumps Will Be Mailed to Engineers on Application.

FIG. 50, STANDARD SIZES, CAPACITIES, ETC.

PLUNGERS		CAPACITY Gallons Per Hr.	Max. Working Pressure, Lbs.	DIAM. OF PIPES		PLUNGERS		CAPACITY Gallons Per Hr.	Max. Working Pressure, Lbs.	DIAM. OF PIPES	
Diam. In.	Stroke In.			Suction In.	Discharge In.	Diam. In.	Stroke In.			Suction In.	Discharge In.
2	2	340	150	1½	1	6	8	9660	140	4	3
2½	2	532	150	1½	1	7	8	13400	150	5	4
2½	3	684	150	2	1½	8	8	17240	150	5	4
	3	972	150	2	1½	8½	8	19460	140	6	5
3½	3	1320	150	2	1½	9	10	24800	160	8	6
3½	4	1800	150	2½	2	10	10	27600	150	8	6
4	4	2340	150	2½	2	11	12	37400	160	10	8
4	6	3540	160	2½	2	12	12	44400	150	10	8
4½	6	4440	150	3	2½	12	14	49200	150	12	10
5	6	5460	150	3	2½	13	14	58000	140	12	10
5½	8	8840	150	4	3						

Digitized by Google

ECONOMY PUMPING MACHINERY CO.

104–118 No. Curtis St., CHICAGO, ILL.

THOROLY INFORMED SALES ENGINEERS IN ALL CITIES AND LARGE TOWNS



Single Ejector, Fig. 2104

ECONOMY SEWAGE EJECTORS:

Economy submergible ejectors are made in all sizes up to 3000 gallons per minute in one grade only. The design varies with the size but accessibility and reliability are common to all sizes. The bearings and moving parts are all renewable.

Water passages are large to allow passage of solids without clogging. Duplex units are equipped with duplex starting apparatus and two floats. Ejectors of dry basin type designed to your requirements.

568



Duplex Ejector

STANDARD SIZES
Fig. 2104 Single Ejectors

Capacity gallons, min.	Head in feet	Motor horse power	Suitable basin depth, feet	Minimum dia. basin, inches	Discharg. pipe size
8	10	⅙	2 to 4	20	¾"
15	12	¼	3 to 5	20	1
25	15	⅓	3 to 6	20	1¼
40	15	½	3 to 6	24	1½
60	15	1	3 to 8	24	2
80	20	1½	3 to 8	30	2½
110	15	2	3 to 8	36	3
150	15	3	3 to 8	36	3½
250	25	5	3 to 10	48	4
400	25	7½	4 to 10	48	5
600	25	10	4 to 12	54	6

SPEEDS: Above 1½ h.p. 1150 below 1750. For duplex units add 24 inches to minimum basin diameter; multiply capacity by two. Pumps with longer legs or larger capacities furnished to order.



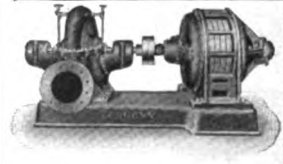
Condensation Pumps and Receivers, Fig. 2176

ECONOMY PUMPS AND RECEIVERS:

Will return condensate from low radiators to boiler. The receiver is set very close to floor saving in nearly all cases cost of pit. Pumps are bronze fitted with ring oiling bearing and ball thrust bearing. Automatic control and full set trimmings furnished with each unit

STANDARD SIZES

Number of unit	Capacity, sq. ft. direct radiation	Motor horse power	Boiler pressure	Pump capacity, g.p.m.	Size receiver, inches
6	2000	¼	10	7½	14x20
6½	3500	⅓	10	12	14x24
7	5000	½	10	15	14x30
7½	7500	¾	15	20	16x30
8	10000	1	15	25	18x30
8½	15000	1½	15	37	20x30
9	25000	2	15	60	20x36
9½	35000	3	15	80	20x42
10	50000	5	15	110	24x42
7B	5000	1	25	15	14x30
7½B	7500	1½	25	20	16x30
8B	10000	1½	25	25	18x30
8½B	15000	2	25	37	20x30
9B	25000	3	25	60	20x36
9½B	35000	5	30	80	20x42
10B	50000	5	35	110	24x42



Horizontal Centrifugal

The Economy Line includes a full line of centrifugal circulating and general service pumps. Reciprocating vacuum pumps, centrifugal vacuum pumps, triplex pumps and pneumatic Water Systems.

Send for catalogue.

Digitized by Google

LUITWIELER PUMPING ENGINE COMPANY

Established 1877

ROCHESTER, N. Y.

BRANCH OFFICE
LOS ANGELES, CAL.

Manufacturer of Deep Well and Triplex Force Pumps

Product:

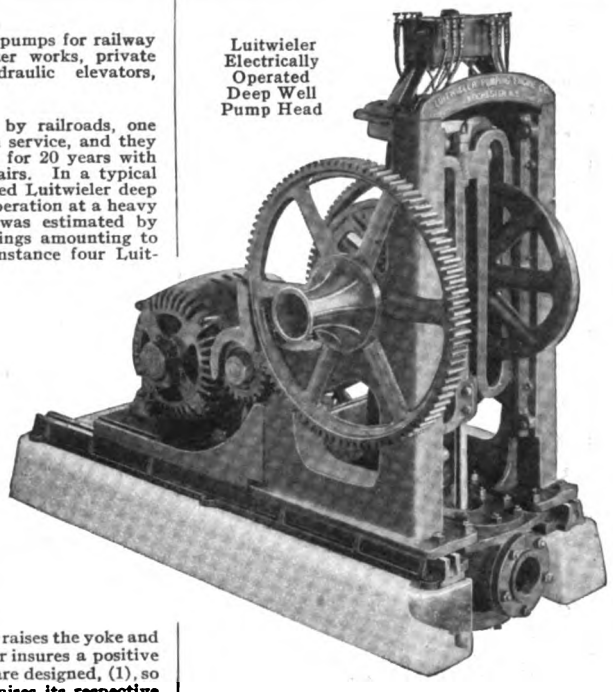
Deep well and triplex force pumps for railway service, city and village water works, private supply, boiler feeding, hydraulic elevators, manufacturing plants, etc.

They are used extensively by railroads, one road having as many as 71 in service, and they have been in continuous duty for 20 years with only nominal expense for repairs. In a typical instance an electrically operated Luitwieler deep well pump, after 10 month's operation at a heavy duty railway water station, was estimated by the road to have effected savings amounting to $125 a month. In another instance four Luitwieler pumps were estimated by a railroad to have effected savings the first year of over $5,000 in excess of cost.

Construction and Operation:

Luitwieler pumps are distinctive in that dead centers and cranks are eliminated, the rotating motion of the drive shaft being transformed into straight line motion by cams. For deep well pumping two cams are key seated opposite each other on the same drive shaft and transmit the power to sliding yokes through rollers, each yoke having an upper and lower roller. Pressure of the cam against the upper roller raises the yoke and pressure against the lower roller insures a positive downward stroke. The cams are designed, (1), so **that in revolving, each cam raises its respective yoke during slightly more than one-half of the period of revolution as a result of which the second yoke begins to rise and assume the load before the first yoke ceases to rise and lift the load, and (2), so that the rise of each yoke is uniform throughout the entire period.**

This motion is thence transmitted to the two pistons in the working barrel of the well through pump rods, the pistons being located directly above and below each other and the pump rods for the upper and lower pistons being hollow and solid, respectively, the hollow rod enclosing the solid and operating concentrically with it. This construction provides for a continuous non-pulsating draft of water from the well; no check valve is required at the intake. This, together with the high degree of equilibrium obtained in the entire mechanism, eliminates jar, vibration, and back lash on gearing, commonly encountered causes of low operating efficiency and rapid depreciation of equipment. The Luitwieler Company demonstrates the degree with which uniformity of operation is accomplished in their pumps by operating one of the smaller electrical drive pumps at full speed for eight minutes during which it remains supported on four pairs of common glass tumblers set bottom to bottom unbraced or fastened.



Luitwieler Electrically Operated Deep Well Pump Head

Method of Drive and Efficiency:

By reason of the continuity of the flow the pumps often afford the means of getting an increased supply from a well without necessitating the enlargement of the boring, of using a smaller pump, or of effecting large reductions in operating expenses resulting from the higher efficiency. The Luitwieler pumps discharge the water at a loss of only 15 to 25 per cent of the energy expended. Balanced as they are, these pumps are also adapted for automatic service, being capable of control, where electrically operated, by a float switch, as in elevated tanks or reservoirs, or on pipe lines, by pressure controls.

The company specializes in electric drive, but adapts the pumps also to steam, fuel oil, or belt drive, power units being carried on the pump jack base, directly connected by gears in deep well pumps and in triplex pumps by a chain running in an oil bath. The pumps have very few parts, all of which are easily accessible for repair, and are equipped with automatic force feed oilers. In pulling the deep well pumps it is only necessary to disconnect the pump rods and slide the head back on the sliding base. In the larger pumps a winch head on the drive shaft provides a convenient and quick means of hoisting the rods or casing.

Digitized by Google

THE GOULDS MANUFACTURING COMPANY

MAIN OFFICE AND WORKS

SENECA FALLS, NEW YORK

NEW YORK	BOSTON	CHICAGO	HOUSTON
16 Murray St. & 19 Park Place	58 Pearl St.	12-14 S. Clinton St.	1001 Carter Bldg.
PHILADELPHIA	**PITTSBURGH**	**ATLANTA**	**DETROIT**
111 North 3rd St.	Oliver Bldg.	Citizens & Southern Bank Bldg.	804 Dime Bank Bldg.

Manufacturers of Pumps for Every Service

GOULDS PUMPS:

The Goulds Line includes hand and power pumps for every service. For 72 years Goulds Reliable Pumps have been generally recognized as the world's standard of quality. They are built to operate with the least possible power and all parts are made of the best material to give long, reliable service. They are rated conservatively, and when you get a Goulds Pump you can be absolutely sure that it will do just what we claim for it. Every Goulds Pump sold is guaranteed to give reliable, satisfactory service under the conditions for which it is recommended.

We have distributing houses and representatives in all principal cities, where stocks of pumps are carried from which prompt shipment can be made.

SERVICE:

The Goulds line includes types and capacities for all pumping services from water to tar and clay, and either acid, alkali or neutral.

It includes the small pump as well as the large pump delivering thousands of gallons per minute.

The pumps can be furnished for belt, chain, gear or direct drive from all types of drivers.

ENGINEERING SERVICE:

Parties contemplating the installation of pumping equipment are invited to present their problems to this organization, which is prepared to assist in selecting the proper and most economical pump for their purposes.

Here follow a few points descriptive of a few of the pumps we make.

CENTRIFUGAL PUMPS:

Single Stage, Single Suction (Fig. 3000–3004) Open Impeller.

The Fig. 3000 Single Stage, Centrifugal Pump, although extremely well adapted for general pumping service, is also well fitted for many special services. There are no valves to get out of order, and the pump is practically noiseless in operation.

The large open water passages of the Goulds Single Stage, Single Side Suction Centrifugal Pump adapt it particularly well for handling sewage and similar liquids. As a mine pump, it is well fitted, since the sand and grit, nearly always present in mine water, will not injure it. As a pump for irrigation, general water supply and booster service, Goulds Centrifugal Pumps excel on account of the high efficiencies which are obtained.

Figure 3004 illustrates the Goulds Single Stage, Single Side Suction Horizontal Shaft Centrifugal Pump direct connected to an electric motor. The pump and the motor are mounted upon an extended cast iron base plate, making the unit practically self-contained. The pump and the motor are direct connected by means of a suitable coupling of the flexible or rigid type, depending upon the conditions of service. It is built in sizes that range from 20 to 5000 gallons per minute capacity. Built in either right or left hand style.

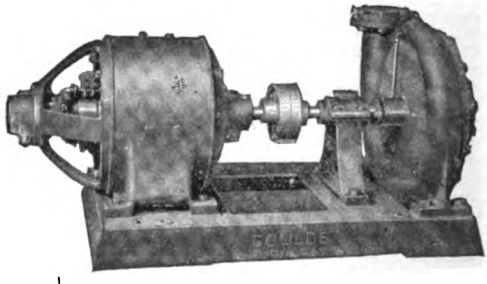


Figure 3004 Connected to Electric Motor

Ask for Bulletin 105.

Digitized by Google

SINGLE STAGE, SINGLE SUCTION, ENCLOSED IMPELLER (Fig. 3600):



Goulds Fig. 3600 Centrifugal

Goulds Fig. 3600 Horizontal Single Stage, Single Suction Enclosed Impeller Centrifugal Pump has not only high efficiency but is a moderately priced machine. It is a higher speed than the Fig. 3000 and 3004, and is designed especially for direct connection to electric motors.

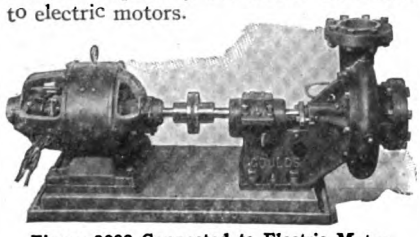
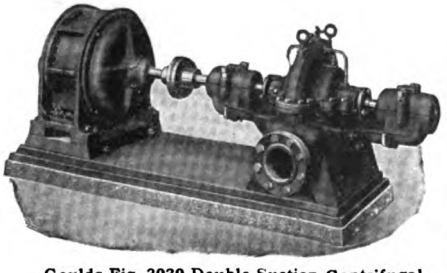


Figure 3600 Connected to Electric Motor

The range of capacity and head can be accommodated at motor speeds readily obtainable in direct current, and alternating current of twenty-five, fifty and sixty cycles frequency. All main bearings are of the ring oiling type, sizes 5 and 6 having two rings. It will be noticed that the pump consists of but very few parts, and it has the utmost simplicity of design. In addition to cold water these pumps may be used for pumping clear liquids such as brine, gasoline, kerosene, light machine oils, etc.

Complete data in Bulletin 119.

SINGLE STAGE, DOUBLE SUCTION (Fig. 3030):



Goulds Fig. 3030 Double Suction Centrifugal Pump

Figure 3030—Single Stage, Double Suction Centrifugal Pump, direct connected to electric motor. This unit is adapted for general water supply, hot water circulating in heating systems, for irrigating, booster or mine service, where the total net head does not exceed 150 feet. The Goulds Single Stage, Double Suction Centrifugal Pump excels on account of the high efficiency obtained. 50 to 8000 gallons per minute, based on cold clear water, 150 ft. head or 65 lb. pressure. For all forms of drive.

Complete data in Bulletin 110.

CENTRIFUGAL SUMP PUMPS (Fig. 3013):



The Goulds Fig. 3013 Electric Sump or Bilge Pump is an automatic electric pump used to elevate to street sewers the drainage in buildings where the basement floors, boilers and elevator pits are below sewer level or for any other service where the liquid to be pumped accumulates in a catch basin, pit or tank.

Fig. 3013 Centrifugal Sump Pump

Complete data in Bulletin 111.

CENTRIFUGAL FIREPUMPS (Fig. 3014):

Used to discharge direct into hose lines or for service with automatic sprinkler systems.

The Goulds Centrifugal Pump has all of the characteristics that are the most desirable for fire protection service. The capacity is large for the floor space required, and the weight and first cost are low as compared with many other types of pumps; the construction is extremely simple and there is nothing to get out of order and cause delay when the pump is needed; the pump is adapted for direct connection to electric motors, steam turbines or gasoline motors, and it maintains a steady pressure at the discharge.

Capacities from 500–1500 gallons per minute at 150 lb. pressure.

Complete data in Bulletin 118.

(Continued on next pages)

Digitized by Google

(Continued from preceding pages)

MULTI-STAGE HIGH LIFT CENTRIFUGAL PUMPS (Fig. 3300):

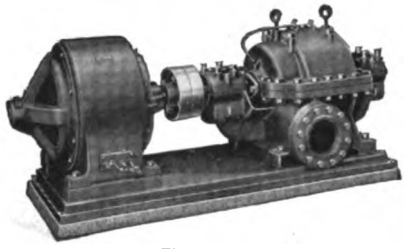


Fig. 3300

Fig. 3300 illustrates Goulds Multi-stage High Lift Centrifugal Pumps. These pumps are designed for direct connection to motor, turbine or engine both mounted on same base but can also be made for belt drive. These pumps are made to take the place of one or more single stage pumps and will operate against a maximum head of 250 lbs. or 580 feet. They range in capacity from 50 to 2000 gallons per minute.

572 *Ask for Bulletin No. 120.*

TRIPLEX PLUNGER PUMPS SINGLE ACTING (Figs. 1157, 1648, 1672, 1696):

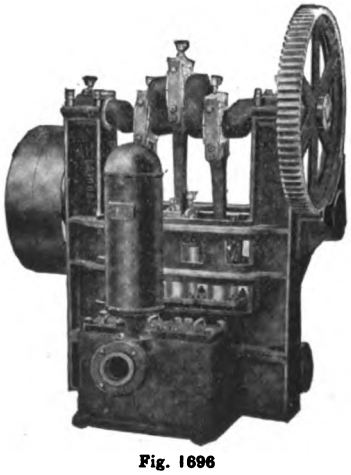


Fig. 1696

These pumps are designed on the same general lines throughout, but details of construction are varied somewhat for different working conditions and pressures, the latter ranging from 100 lbs. or 231 ft. elevation to 300 lbs. or 693 ft. elevation. Furnished for all forms of drive.

Complete data in Bulletin 101.

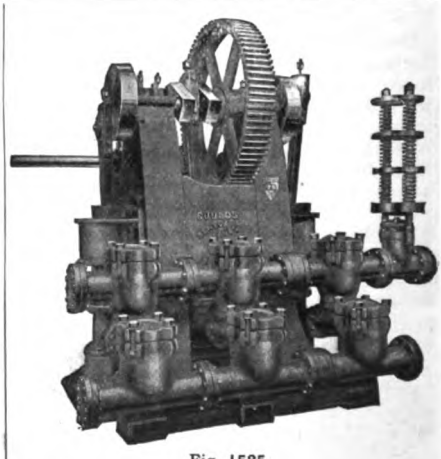


Fig. 1585

Fig. 1585 is a large capacity pump built in sizes covering a wide range of service, including general water supply, municipal waterworks, boiler feeding, hydraulic elevators, mine pumping, oil pipe lines, accumulators, hydraulic presses, etc. For 215 to 1,500 Pounds Working Pressure or 500 to 3,500 Feet Elevation. Other large capacity pumps shown in Goulds Bulletin No. 103 and 104.

DEEP WELL TYPE:

For 130 Pounds Working Pressure or 300 Feet Elevation. Capacities ranging from 5,400 gallons to 16,500 gallons per hour. For deep open wells, where the water is too low to be reached by suction from the surface. *Bulletin 107.*

PORTABLE MINE TYPE (Fig. 966):

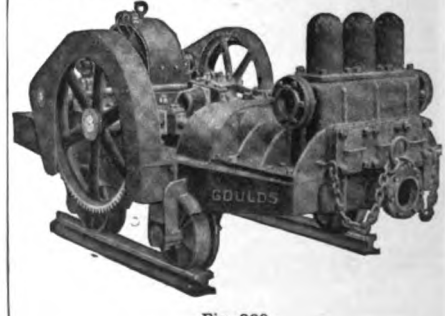


Fig. 966

This pump is of the horizontal, outside packed plunger type, and is designed especially for pumping mine sumps. It is

Digitized by Google

made for any gauge of track, compactly and strongly built to take up as small a space as possible, consistent with good service. Three air chambers are used instead of one to reduce the height. Any make of moisture-proof motor can be fitted to this pump. For 130 Pounds Working Pressure or 300 Feet Elevation. Capacities from 50 to 300 gallons per minute. *Bulletin 109.*

DOUBLE ACTING PISTON VACUUM PUMPS:

Vertical, Horizontal, and Horizontal Duplex types. These pumps are designed for Suction-Box on Paper Machines, Vacuum Pans, Surface Condensers, and Vacuum system of Steam Heating. They have a displacement of 10,200 gallons to 162,000 (Duplex type) per hour. A special feature of the construction of the Horizontal types is that the waterways are so constructed that the valves at both ends of the cylinder are always submerged and the usual priming of the valves is not necessary.

Complete data in Bulletin 106.

SINGLE-ACTING TRIPLEX PLUNGER STUFF PUMPS:

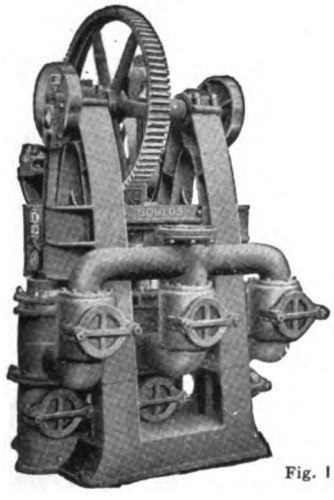


Fig. 1128

For 43 and 65 Pounds Working Pressure or 100 to 150 Feet Elevation. Manufactured in three types, Nos. 1128, 1105 and 969 series with capacities ranging upward to 56 tons dry paper in 24 hours with Pumps 1128. Designed and built to stand constant hard work, pumping Wood Pulp and Stuff in Paper Mills and Pumping Size in Textile Mills. *Bulletin 106.*

BULLETINS:

The following bulletins, any of which will be sent on request, give complete specifications on the various standard types of Goulds Power Pumps.

No. 100 Double-Acting, Single Cylinder Piston Pumps.

No. 101 Single-Acting, Triplex Plunger Pumps, Outside-Guided Type.

No. 103 Single-Acting, Triplex Plunger Pumps, Large Capacity and High Pressure Types.

No. 104 Double-Acting, Triplex Piston Pumps, Vertical Type.

No. 105 Single-Stage, Single Side Suction Centrifugal Pumps.

No. 106 Vacuum and Stuff Pumps.

No. 107 Deep Well Triplex Pumps.

No. 108 Deep Well Working Heads and Cylinders.

No. 109 Portable Mine Pumps.

No. 110 Single-Stage, Double Suction Centrifugal Pumps

No. 111 Centrifugal Sump Pumps.

No. 112 Handy Data on Power Pumping.

No. 113 Power Rotary Pumps.

No. 114 Vertical, Single-Stage Centrifugal Pumps.

No. 115 Double-Acting, Triplex Plunger Pumps, Horizontal Type.

No. 116 Single-Acting, Triplex Pressure Pumps.

No. 118 Centrifugal Fire Pumps.

No. 119 Single-Stage, Single Suction Centrifugal Pumps, Enclosed Impeller Type.

No. 120 Multi-Stage Centrifugal Pumps for General Service.

No. 122 Centrifugal Pump Data.

Every Goulds pump is guaranteed to perform satisfactorily the specific work for which we recommend it.



Digitized by Google

THE JOHN H. McGOWAN COMPANY

CINCINNATI, OHIO

Steam and Power Driven Duplex Pumps for all Uses

PRODUCTS:

Duplex Steam and Power Driven Pumps for all uses; Elevator and Water Works Pumping Engines; Electric Pumps furnished with all customary forms of drives in Mounted Motor and Extension Base Types.

McG PUMPING MACHINERY

Trade Mark

INSPECTION:

The same rule of inspection inaugurated by the U. S. Shipping Board, Emergency Fleet Corporation in the production of pumps for the Emergency Fleet, is being continued in the production of McGowan Pumps.

SPECIFICATIONS:

Complete specifications covering detailed construction will be furnished with all proposals for special equipment and for standard steam and power driven pumps when requested.

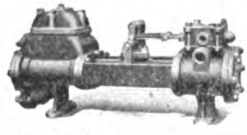


Fig. 1295—Packed Piston Boiler Feeder, size 5¼x3½x5

INSTALLATION DIAGRAMS:

All bulletins relating to McGowan duplex steam or power driven pumps have the installation diagrams incorporated for the convenience of the buyer in planning their location.

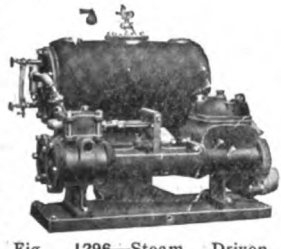


Fig. 1296—Steam Driven Type Automatic Feed Pump and Receiver representing sizes 7½x5x10 and smaller

STANDARDIZATION:

All McGowan Duplex Pumps are built on the interchangeable system through the use of modern Jigs and Templates, except with regard to the final fitting necessary in the installation of large duplicate parts of Pumping Units.

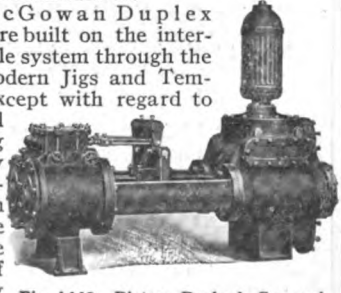


Fig 1443—Piston Packed General Service Pump, size 12x10x12

GUARANTEE:

All pumps are guaranteed to perform the service for which they are recommended and against any defects in either workmanship or material, arising during the term of the guarantee outlined in proposals.

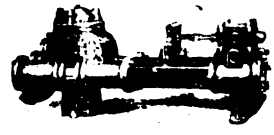


Fig. 1331—Center Packed Plunger Boiler Feed and General Service Pump, size 6x4x6

McGOWAN DUPLEX STEAM PUMPS: Bulletin 60

The valve plate design of duplex steam pump is built in the packed piston pattern having fluid ends 8½" x 12" and smaller, while the valve plate outside center packed plunger patterns are 6" x 10" and smaller. They represent a high standard of pump construction, which insures a decided reduction in the cost of maintenance and improvement in pump service.



Fig. 1282—Pot Valve Pattern Oil Line or Heavy Pressure Pump, size 16x3x10

The special features of construction comprize (*a*) A cross head of spool form permitting rotating of pistons. (*b*) Renewable crosshead wipers on Rocker Arms. (*c*) Brass piston rod packing-box nuts fitted with swiveled glands. (*d*) Threaded packing boxes screwed into the inner heads of pump cylinders which obviates the necessity of housing gaskets on the pump end. (*e*) Adjustable packed water

Digitized by Google

pistons, and (*f*) Brass bushed plunger packing box neck rings in all Center Packed Plunger Pumps, which construction obviates the necessity of reboring packing boxes when repairs to plungers become necessary.

These pumps in sizes 7½x5x10 and smaller, are furnished in connection with Receivers for the Automatic return of condensation to boilers from heating and drying systems, engine jackets, cooking apparatus and for similar service.

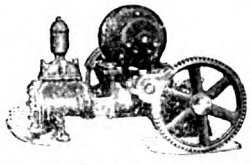


Fig. 1374–Packed Piston Boiler Feed and General Service Pump with Top Motor Mounting, size 4x6

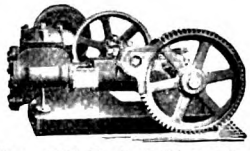


Fig. 1404–Packed Piston General Service Mine Pump with Side Motor Mounting, size 4x6

McGOWAN DUPLEX POWER PUMPS:

Bulletin 80

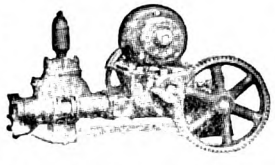


Fig. 1383–Center Packed Plunger Boiler Feed and General Service Pump with Top Motor Mounting, size 4x6

The valve plate design of duplex power pump is built in the packed piston and outside center packed plunger patterns. The sizes correspond to the pump ends used in the McGowan duplex steam pumps of the same design and are interchangeable with them. They represent a line of commercial duplex power pumps adapted for all modern types of drives.

Sizes 5x6 and smaller are furnished in connection with receivers for the automatic return of condensation to boilers, or general purpose pumping where automatic regulation is required.

SPECIAL SERVICE PUMPS:

These are built in either Vertical or Horizontal Packed Piston, Inside Packed, Outside Center Packed or Pat Valve Patterns for all usual duties in connection with private industrial or Municipal Water Supply in combination with

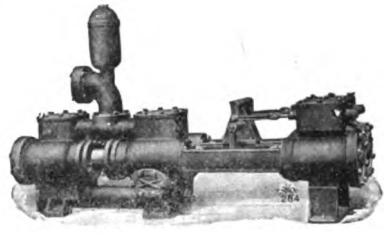


Fig. 1284–Outside Center Packed Straightway Pattern, Size 14x8x12

Simple, Compound and Triple Expansion Steam Ends. The arrangement of the steam cylinders in the Compound and Triple Expansion Types is such as to permit access to and the removal of all steam pistons without disturbing any other part than the respective steam cylinder heads.

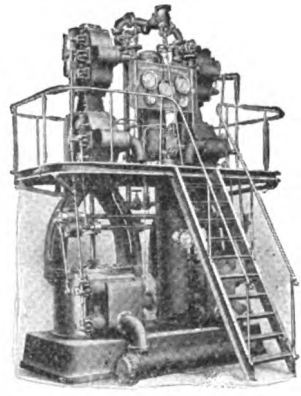


Fig. 1322–Triple Expansion Steam End for Use in Combination with Vertical Type of Pump Ends

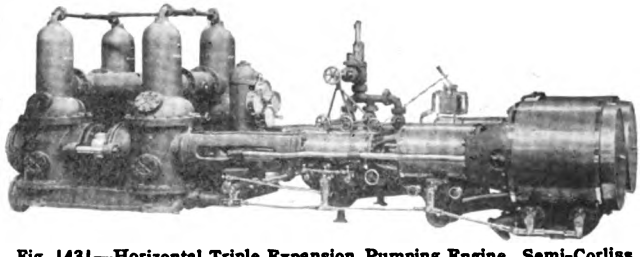


Fig. 1431—Horizontal Triple Expansion Pumping Engine, Semi-Corliss Condensing Type Built with Packed Piston, Inside Packed, Center or End Packed Plunger Types of Pump End

Digitized by Google

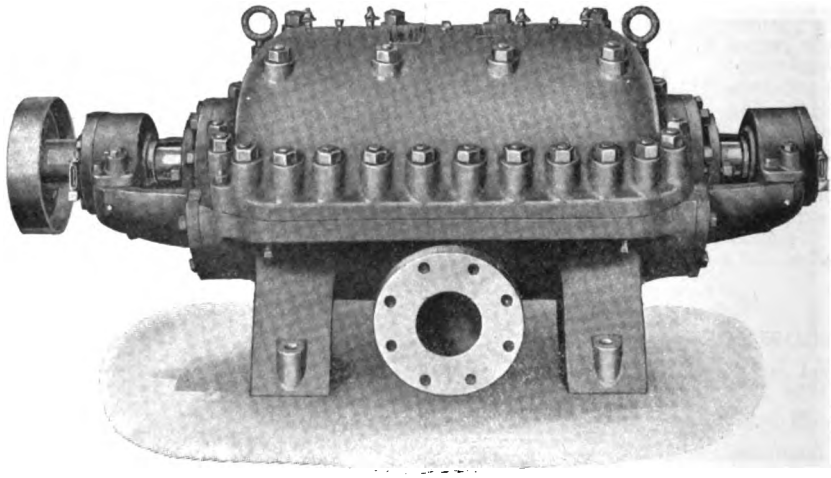
MANISTEE IRON WORKS COMPANY

MANISTEE, MICHIGAN

Manufacturers of the Manistee Roturbo Centrifugal Pump, Rotary Jet Condensers, Air Pumps

BRANCH OFFICES

CHICAGO, ILLINOIS
CINCINNATI, OHIO
CLEVELAND, OHIO
TOLEDO, OHIO
CEDAR RAPIDS, IOWA
BIRMINGHAM, ALABAMA
BUFFALO, N. Y.
BOSTON, MASS.
DETROIT, MICHIGAN
DALLAS, TEXAS
HOUSTON, TEXAS
TAMPICO, MEXICO
NEW YORK CITY, N. Y.
NEW ORLEANS, LA.
PHILADELPHIA, PA.
PITTSBURGH, PA.
SALT LAKE CITY, UTAH
ST. LOUIS, MO.
KANSAS CITY, MO.
ST. PAUL, MINN.
MIAMI, FLORIDA
SAN FRANCISCO, CALIF.
ATLANTA, GA.
DENVER, COLORADO
MILWAUKEE, WIS.



MANISTEE ROTURBO CENTRIFUGAL PUMPS:

The Manistee Roturbo Centrifugal Pumps are approved by all operators and owners on account of their records of high efficiency and durability. These two positive advantages are obtained not only on account of sound engineering principles in design but also because of the fine workmanship and the use of high grade materials.

The pumps are offered both in the VERTICAL and HORIZONTAL split type on construction—in any size—for any type of drive. They are especially adaptable where high and lasting efficiences are desired.

It is our objective to place equipment only to the advantage of the Customer for which purpose we maintain a corps of engineers and well informed representatives. We respectfully request the opportunity to be of assistance.

(See page 158 for additional products of this Company)

Digitized by Google

NORTHERN FIRE APPARATUS CO.

2434 UNIVERSITY AVE., S. E., MINNEAPOLIS, MINN.

EASTERN REP: EDWARD J. SMITH, 30 Church Street, NEW YORK CITY
MEXICAN REP: ABEL G. RIOS, Edificio Del Banco De Londresy, MEXICO CITY

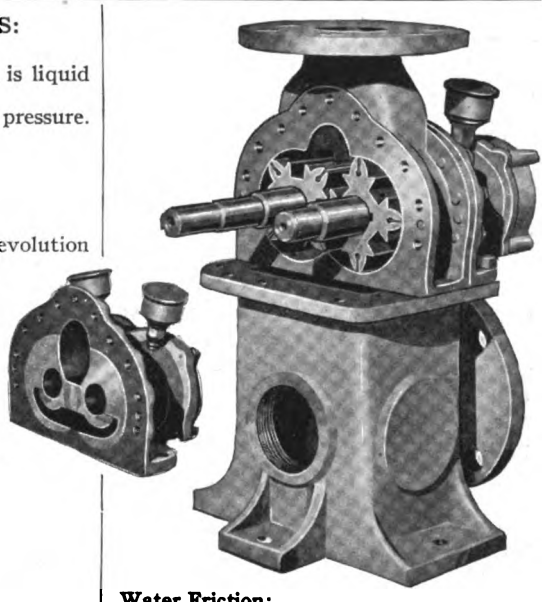
Manufacturers of the Northern Rotary Pumps

NORTHERN ROTARY PUMPS:

For any industry where there is liquid to move under either high or low pressure.

Positive Displacement Type:

This means that with every revolution a definite volume is moved from the suction to the discharge side of the pump. It means that the Northern is self-priming. Any Northern will lift or draft water 20 feet.



577

Mechanical Friction:

The Cams and pilot gears are the only moving parts in the pump, and their shafts are mounted on high grade, standard Ball Bearings. Bearing friction is practically zero.

Water Friction:

Sharp turns, Reversals in the water path, and Stoppings are all eliminated. Here lies the fundamental reason for the high Northern efficiency.

For Highest Pumping Efficiency

PRESSURE RANGE AND CAPACITIES

Type "B" Pump

Pressure	Gallons Per Minute	Speed in R. P. M.	Horse Power Req'd
50 lbs.	300 to 800	388 to 1010	15 to 50
100 lbs.	300 to 800	407 to 1035	25 to 75
200 lbs.	300 to 900	418 to 1075	50 to 125
300 lbs.	300 to 500	460 to 700	75 to 125

Theoretical Displacement—about 1 gallon per revolution

Type "C" Pump

50 lbs.	125 to 400	350 to 1400	5 to 15
100 lbs.	125 to 400	375 to 1450	10 to 30
200 lbs.	125 to 300	450 to 1350	25 to 50
300 lbs.	125 to 250	500 to 1000	30 to 60

Type "E" Pump

50 lbs	17 to 40	900 to 2000	1 to 2
100 lbs.	16 to 40	900 to 2000	2 to 4
200 lbs.	15 to 40	900 to 2000	4 to 7½
300 lbs.	14 to 36	900 to 2000	5 to 10
400 lbs.	13 to 32	900 to 2000	7½ to 12
500 lbs.	12 to 30	900 to 2000	7½ to 15

Digitized by Google

MORRIS MACHINE WORKS

BALDWINSVILLE, N. Y.

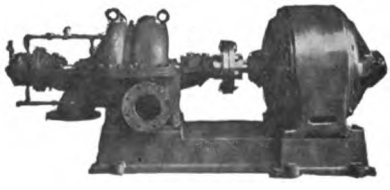
Branch Offices in Principal Cities

Since the Civil War Builders of Centrifugal Pumping Machinery, Hydraulic Dredges, Stationary and Marine Engines

We build CENTRIFUGAL PUMPS for almost any service and of all types including side suction and double suction, vertical or horizontal shaft. STAGE PUMPS for high heads. TWIN PUMPS for large capacities and high speeds. Or will design SPECIAL PUMPS to suit special conditions. As one of the oldest and largest firms in the country building exclusively this class of machinery, our experience of over fifty-seven years has covered all services for which Centrifugal Pumps have been used.

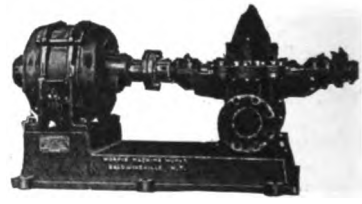
MORRIS CENTRIFUGAL PUMPS:

Are perfectly balanced, require small space and foundation; have high efficiency; are equally suitable for from small up to very large capacities, and can handle sand or solids with the water without injury. These pumps direct connected to reciprocating engines are suitable for moderate heads, or direct connected to electric motor or steam turbine (or belt driven) for high heads. For heads above 100 feet, pumps are preferably built in stages.



Horizontally Split Multi-Stage Pump

The SINGLE- and MULTI-STAGE horizontally split pumps, illustrated, are built to meet the demand for a pump capable of high speed and efficiency. We build them from 2″ up to 20″ discharge. They are bronze fitted and where pumping acids the entire water end is made of acid-resisting bronze. This type is used by the Navy Department.



Horizontally Split Single-Stage Pump

Arranged for belt, motor or turbine drive as desired.

DREDGING PUMPS:

MORRIS DREDGING PUMPS are made in sizes from 2″ discharge and upward, built of cast iron, carbon or manganese steel, both lined and unlined. They are belt driven or direct connected to steam engines. For the sake of economy 15-inch and larger dredging pumps are usually directly connected to compound or triple expansion steam engines. We have also many dredging pumps in service directly connected to electric motors. We can furnish pumps only or the complete dredge, including all machinery.

STEAM ENGINES:

We also build a complete line of STATIONARY and MARINE ENGINES, in single cylinder, compound and triple expansion types from 1½ up to 1000 H. P.



Write for complete catalog today.

Digitized by Google

MORRIS MACHINE WORKS **BALDWINSVILLE, N. Y.**

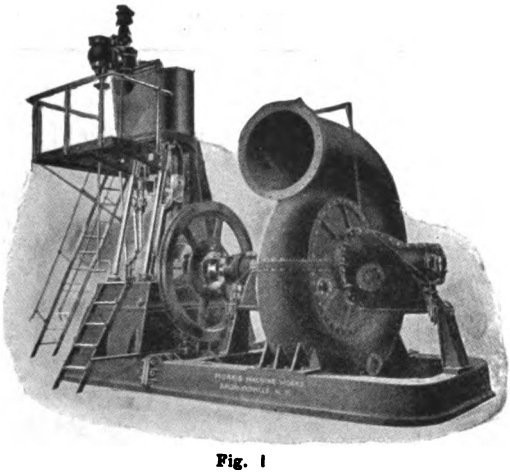


Fig. 1

At present we are making a specialty of circulating pumps for surface condensers, as well as pumps for dry docks; also marine engines.

Fig. 3 shows a large triple expansion marine engine of 800 H. P.

Fig. 1 shows one unit of a large dry dock pumping system, which consists of three 36-inch directly connected Pumping Engines. Total average capacity, 115,000 gallons per minute. Total horse-power engines, 1050.

Fig. 2 shows a set of large circulating pumps for surface condensers. They are 20-inch All Composition Pumps, directly connected to Compound Engines. Built for 250 pounds steam pressure.

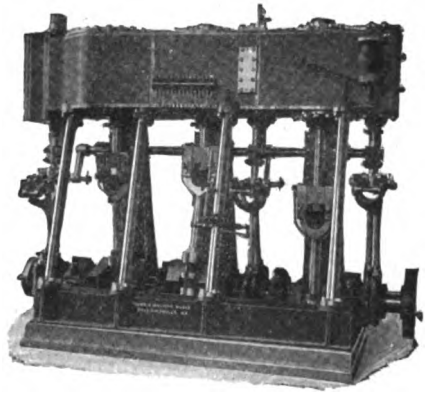


Fig. 3

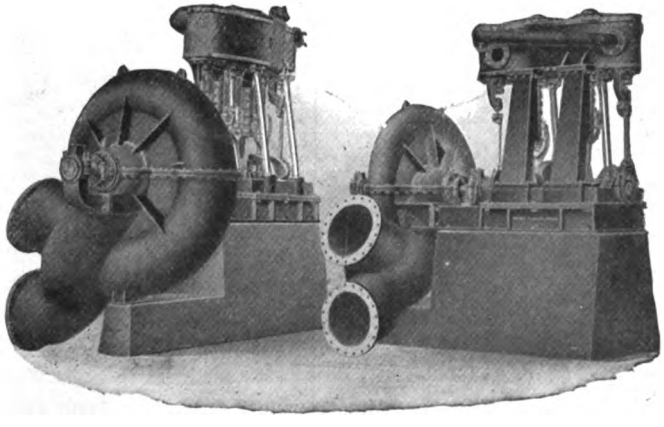


Fig. 2

Digitized by Google

THE PRESCOTT COMPANY

FRED. M. PRESCOTT, PRESIDENT

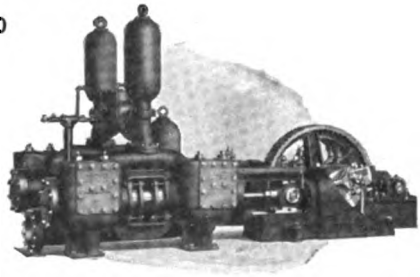
MENOMINEE, MICHIGAN, U. S. A.

MINE PRESCOTT MENOMINEE PUMPS

Electric Drive

The past five years have been, perhaps, as historical a time in the development of pumping machinery for mines as any so far in the life of this great industry, and the two outstanding reasons for this are: First, the ever-increasing use and adaptation of electricity in the mining fields; and, secondly, the greater depths to which shafts are being sunk.

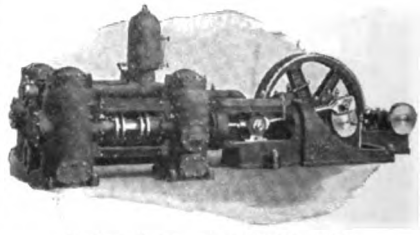
Type "C"



Built in Sizes up to 1000 G. P. M. and 500 Ft. Hds.

In the ordinary wet mine a greater variety of problems to pump builders is found than in any other place. Mining men have every condition to contend with known to pump manufacturers. All kinds of pumps are used, the entire field of low and high service is covered—water of every character is encountered and it is an extremely serious proposition in the case of the average mine to keep the pumps running continuously. It is a hard service and the best pumps money can buy are absolutely necessary.

Type "M"



Built in Sizes up to 5000 G. P. M. and 500 Ft. Hds.

We design and build just such Electric Mine Pumps. They are of the horizontal duplex double-acting type and are made in sizes for any capacity and any pressures. Large valve areas and water passages characterize all our different types. Friction losses are thus reduced to a minimum and pumps of the highest efficiency obtained.

The steady growth of our business and rapid extension of our lines render it impossible to show everything here that we make. The machines illustrated, however, will give those contemplating buying pumping machinery a fair idea of the nature of our product.

"Pot Form"



For Any Gallonage and Any Head

We would, therefore, appreciate it highly if prospective purchasers would write us relative to their individual problems and the purpose to be accomplished, and allow us to submit detailed information covering their requirements.

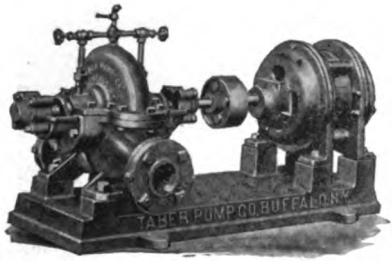
Digitized by Google

TABER PUMP CO.

291 ELM ST., BUFFALO, N. Y.

Manufacturers of Taber Rotary and Centrifugal Pumps

TABER "SV" CENTRIFUGAL PUMPS:



The "SV" pump is built in many sizes so that a variety of head and capacity conditions can be met. Each pump is built to suit the specific specifications, and the work is tested carefully to see that these are met before shipment is made.

TABER "V" CENTRIFUGAL PUMPS:



The Taber "V" type open Impeller, Low Head, motor driven Centrifugal Pumps range in capacities from 25 to 1200 G. P. M.

Send for Bulletin No. 20.

TABER "S" ROTARY PUMPS:



Taber "S" type motor driven, Rotary Pump is fitted with bronze, self-compensating buckets, air chamber or relief valve.

This pump is extensively used for handling oils, gasoline, etc.

Send for Bulletin No. 31.

TABER "T" ROTARY PUMPS:

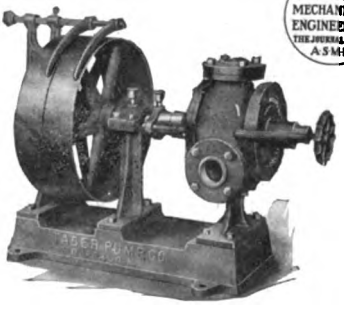


Taber "T" type steam jacketed, bronze lined, Rotary Pumps are designed specifically for handling very viscous materials such as pitch, tar, rubber, cement, asphalt, etc.

TABER SANITARY FOOD STUFFS PUMP:

SEE OUR ADVT. IN MECHANICAL ENGINEERING THE JOURNAL OF THE A.S.M.E.

581



The Taber Sanitary Foodstuffs Pump can be kept absolutely clean because it can be completely dissembled in a few minutes. The pump is entirely bronze fitted.

The Taber Pump Company are pump specialists building units to suit the specific service for which it is intended and thus better service and satisfaction is obtained by the users.

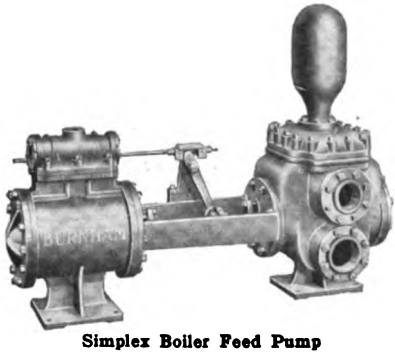
The foregoing illustrations and descriptive text show, briefly, a few types of Taber pumps. We would be pleased to furnish detailed information regarding a Taber pump for any existing or prospective service.

Digitized by Google

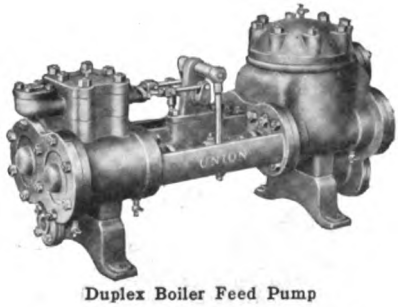
UNION STEAM PUMP CO.

BATTLE CREEK, MICH., U. S. A.

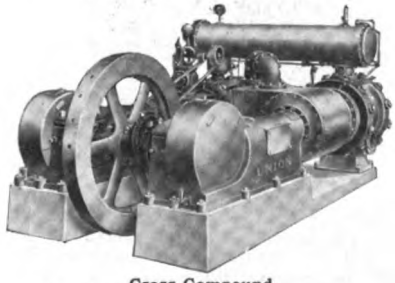
Manufacturers of Simplex and Duplex, Steam and Power Driven Pumps, Centrifugal Pumps, Condensers, Compressors



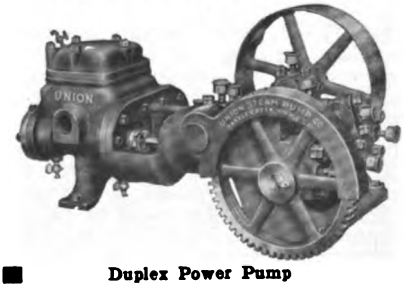
Simplex Boiler Feed Pump



Duplex Boiler Feed Pump



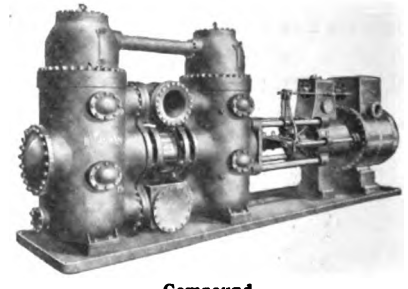
Cross Compound
Duplex Two-Stage Air Compressor



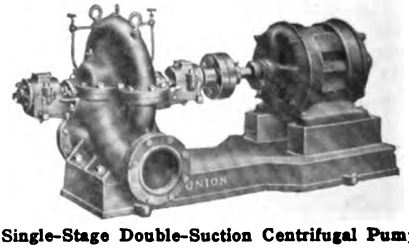
■ **Duplex Power Pump**



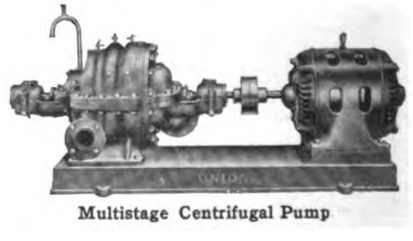
Surface Condenser



Compound
Simplex Center Packed Plunger Pump



Single-Stage Double-Suction Centrifugal Pump



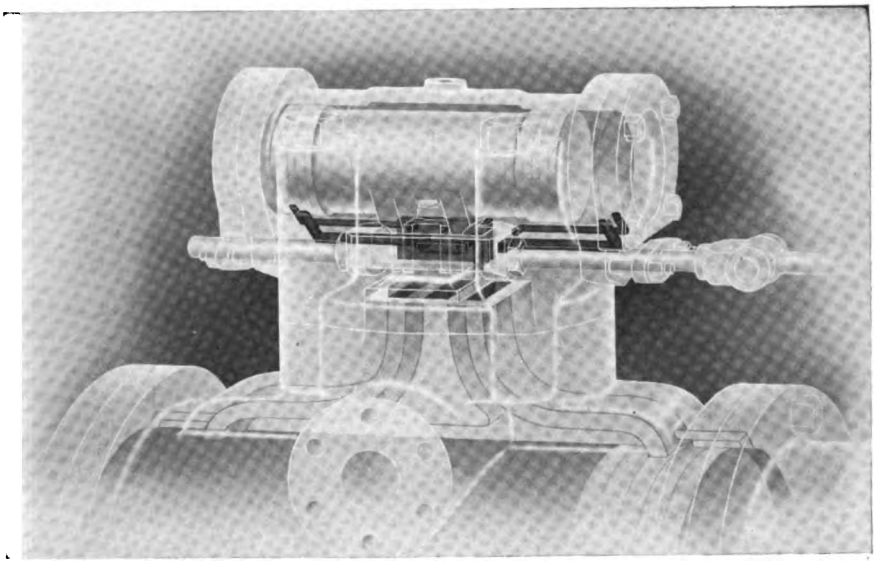
Multistage Centrifugal Pump

Digitized by Google

WARREN STEAM PUMP COMPANY

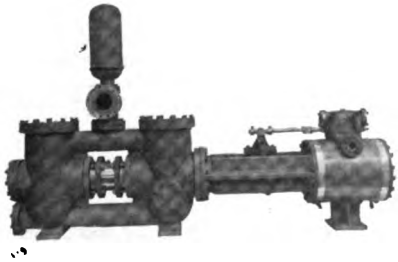
WARREN, MASS.

Manufacturers of Steam and Power Pumping Machinery



PHANTOM VIEW OF PATENTED WARREN "ECLIPSE" VALVE CHEST

All Warren single pumps are fitted with the patented **Warren "Eclipse" valve gear** which, under test and in service, has proven most efficient, dependable and durable. The economy of steam consumption effected through its use is so marked as to place it second to no other valve gear for direct-acting single pumps.



Single Pump Fitted with Eclipse Gear

Its operation is simple and combines a mechanical movement of the main slide valve, which acts as a cut-off, with a steam actuated movement through means of a valve driving piston, assuring a positive operation.

An illustrated bulletin describing in detail the construction and operation of this valve gear will be mailed to any address upon receipt of request.

Digitized by Google

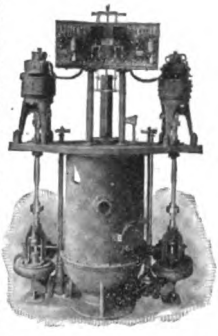
YEOMANS BROTHERS COMPANY

1426 DAYTON ST., CHICAGO

Representatives in Principal Cities

Manufacturers of Sewage Ejectors and Pumping Machinery; Municipal Sewage Pumping Plants

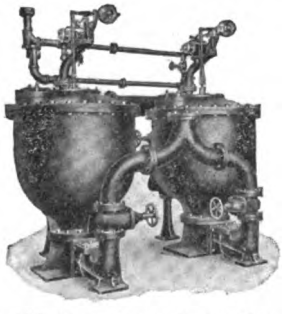
YEOMANS FORM "A" DUPLEX CENTRIFUGAL SEWAGE EJECTORS:



For raising sewage and drainage from deep basements or low-level sewers in hotels, office buildings, industrial plants, municipalities, sub-ways, real estate subdivisions, etc. High grade equipments with suction type pumps operating in dry pit, direct connected to slow speed motors, cast-iron receivers, with large area, self-cleaning, cast-iron screen, high water alarm, automatic control, flush-back check valves, force feed lubrication, ball thrust bearings, all parts easily accessible, no sedimentation or clogging. In use for many years in important buildings, U. S. Government stations and municipalities.

584

SHONE PNEUMATIC SEWAGE EJECTORS:



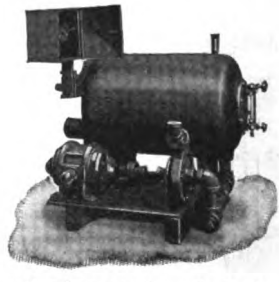
The oldest and most reliable device on the market for handling crude sewage in all classes of service. Automatic, sanitary and durable—requiring minimum attention, nominal maintenance cost. No screens, no storage chambers, no floats. Ejectors can be located under thoroughfares and operated from compressor plants at any desired distance from Ejectors. Either electric or steam compressors can be used, or compressed air from supply maintained in industrial plants for other purposes. Shone Ejectors have been in use for over thirty-five years in all parts of the world.

YEOMANS ELECTRIC BILGE OR SUMP PUMPS—SINGLE AND DUPLEX:



For raising drainage from deep basements, condenser pits, subways, etc., built in two grades: Grade 1, slow speed pumps with force feed ball thrust bearings, oil immersed, submerged pump bearings, high water alarm, float enclosed in pipe casing, and other distinctive features; Grade 2, moderate speed equipments with babbitt thrust bearings, exposed copper floats, without high water alarm; both grades extremely rugged in design and construction and built for most exacting service.

YEOMANS CONDENSATION RETURN PUMPS AND RECEIVERS:



For returning condensate to boilers in gravity heating systems. Receiver with direct connected pump and motor all mounted on one base, enclosed automatic control; positive and efficient. Type "H" (see cut) for return lines above floor level; Type "V" (similar to Bilge Pump) for return lines below floor level.

Yeomans Single- and Multi-Stage Centrifugal Pumps for house supply and general service. Gravity or compression water supply systems for hotels, office buildings, etc.

Digitized by Google

A. D. COOK, INC.

LAWRENCEBURG, INDIANA

Manufacturers of Well Supplies, Pumps, Tools, etc.

PRODUCTS:

Steam and Power DEEP WELL PUMPS, both Single and Double Stroke
Single Acting Deep Well Working Barrels in all Standard Types
Double Acting Deep Well Working Barrels
Double Stroke Deep Well Working Barrels
Wooden "Sucker Rods" for Water and Oil Wells
The COOK Patent Brass Tube Well STRAINER
Well Drilling and Fishing Tools
Fire Hydrants
Foot Valves and a
Complete Line of DEEP WELL ACCESSORIES

Write for Bulletin on Deep Well Equipment interested in.

WELL STRAINERS:

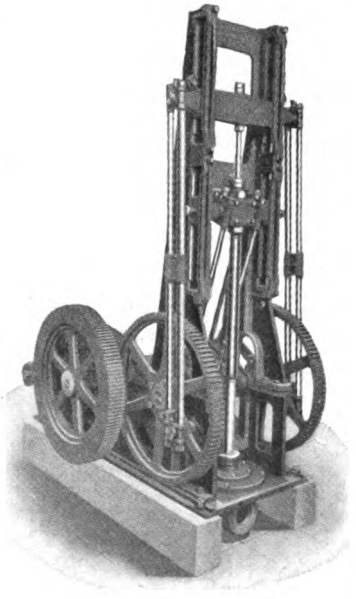
The COOK Patent Brass Tube Well STRAINER, with Standard Fittings which are Bail Plug in the bottom and Foot of Blank and Lead Packer on the top. Top and bottom connections can be varied to suit any plan of installation.

Write for Bulletin 30A —a 16 Page Bulletin on screening wells ending in water bearing sand and gravel.



Fig No. 50

DEEP WELL PUMPS:



585

The above halftone shows the COOK Size 2L Double Stroke Deep Well Pump Head with Electric Motor Direct Connected.

It is designed for operating two plunger valves in working barrel, upper plunger valve connected to lower crosshead by hollow rod and lower plunger connected to upper crosshead by solid rod. Plungers are set 180′ apart so one is always discharging water. The capacity of a single acting pump of same stroke and diameter barrel is nearly doubled. This supplies the want for a perfectly balanced Deep Well Pump demanded by electric drive and at the same time an increased supply from a well of given bore.

Bulletin 27C gives full details as to capacity, etc.

Digitized by Google

NOVO ENGINE CO.

LANSING, MICH.

Manufacturers of Novo Gasoline and Kerosene Engines from 1½ to 15 H. P., Hoists, Force Pumps, Diaphragm Pumps, Air Compressors, Saw Rigs, Etc.

THE NOVO ENGINE:

Is exceedingly simple and reliable in every way. It is built of the very best material for long and continuous service under the hardest of conditions. Novo Engines are frost-proof, simple in construction, with few working parts, and with practically nothing about them to get out of order. Anyone can operate the Novo Engine satisfactorily.



Fig. 255

Novo Engines are built in the following sizes: 1½, 2, 3, 4, 6, 8, 10 and 15 H. P. The 15 H. P. size is of the two-cylinder type.

NOVO HOISTS:

Are made in forty different sizes and types, all combinations, both single and double drum, one or two speeds, reversible or non-reversible. Novo Hoists are light in weight for the power developed. They are easily moved about and can be started and stopped as soon as the job is ready and completed so there is no waste of fuel. They take up very little space so can be used anywhere.

The Type DH Hoist, Fig. 416, shows the double drum, reversible hoist with 15 H. P. Engine.

The Novo Line also includes a variety of **SAW RIGS** especially built to stand the hard usage demanded of them on all construction jobs. They will save enough time to pay for themselves on one fair-sized job.

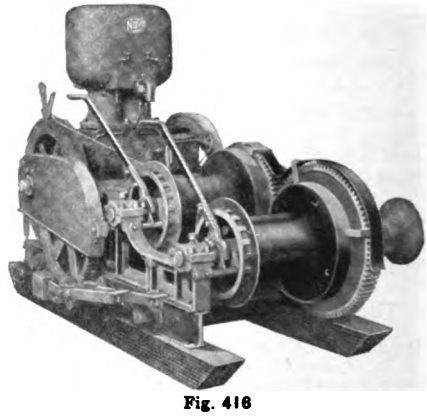


Fig. 416

Ask for our special bulletin on Saw Rigs.

We have illustrated here only a small part of the Novo Line. There are one hundred different sizes and types to choose from.

You should have our general catalog entitled "Catalog 921," containing description and full specifications of Novo Engines and Outfits.

Digitized by Google

NOVO ENGINE CO. LANSING, MICH.

NOVO FORCE PUMPING OUTFITS:

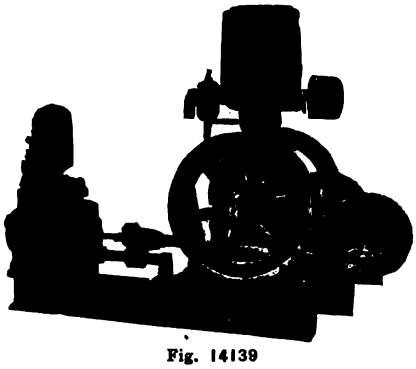


Fig. 14139

Will handle practically any work where a dependable water supply is required.

The Type U Outfit shown in Fig. 14139 is built for high pressure or long distance pumping. It is especially recommended for the job requiring water under pressure, two or three miles from the source of supply.

NOVO TRIPLEX PUMPING OUTFITS:

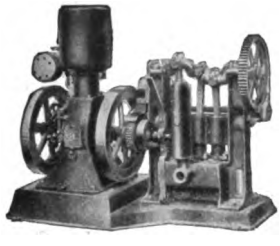


Fig. 1446

Illustrated in Fig. 1446 are also recommended for high pressure pumping where a steady pressure is necessary. The strokes of the three cylinders overlap, thus maintaining a uniform supply. Built in any size up to 15 horse power.

NOVO DIAPHRAGM PUMPING OUTFITS:

Shown in Fig. 403 mounted on skids or hand trucks with one or two pumps as desired are exceedingly useful for draining excavations, trenches, etc., where muddy and gritty water has to be handled.

The Novo Outfits also include chain-driven and direct-connected centrifugal pumping outfits. They move large volumes of muddy or gritty water quickly.

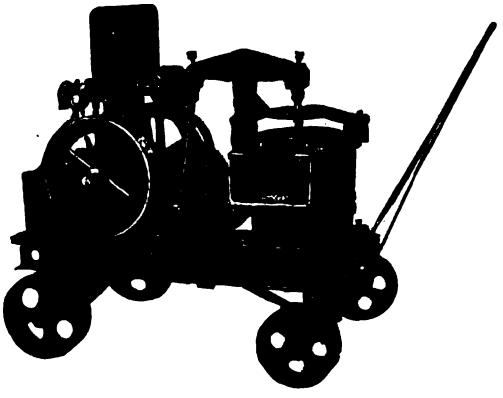


Fig. 403

NOVO AIR COMPRESSOR OUTFITS:

Shown in Fig. 413 with single cylinder compressor or double cylinder types, have capacities from 5 to 80 cu. ft. of free air per minute. Will operate all kinds of air tools satisfactorily.

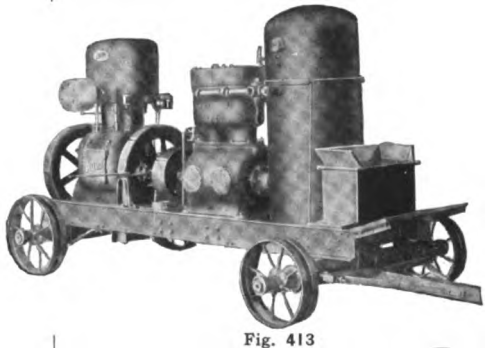


Fig. 413

Our "Catalog 921," gives full information on all Novo Engines and Outfits. Yours for the asking.

SEE OUR ARTICLE IN MECHANICAL ENGINEERING

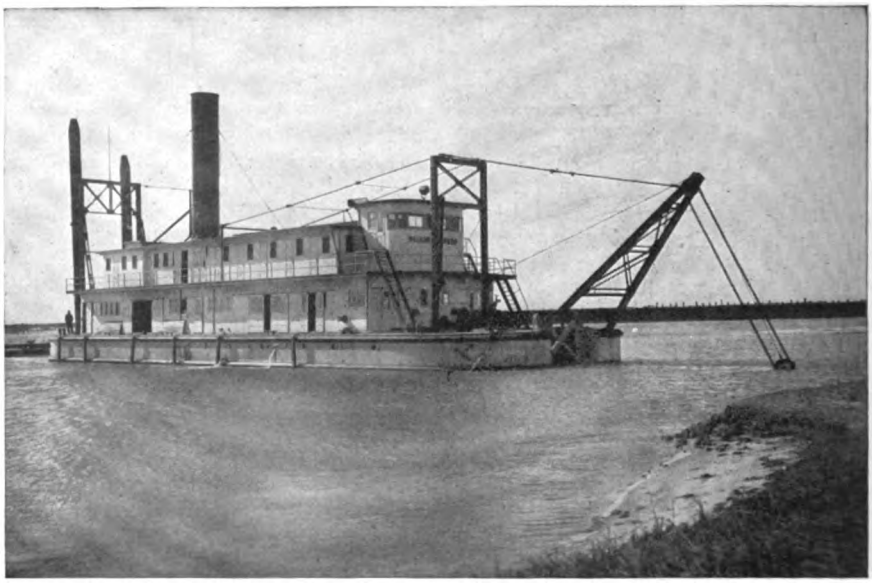
Digitized by Google

ELLICOTT MACHINE CORPORATION

Established 1885

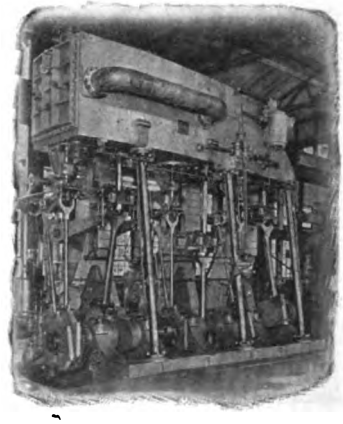
BALTIMORE, MD., U. S. A.

Hydraulic Dredges, Marine Engines, Dredging Machinery, Sand and Gravel Machinery, Centrifugal Pumps, Pumping Engines, Heavy Special Machinery, Machine Work



High Powered Pipe Line Dredge

Hydraulic Dredges of the type illustrated are our standard. Our method of manufacturing and simplicity of design allow us to produce dredges of this type in a comparatively short time. The hydraulic dredge stands in a class by itself as the only practicable machine for filling in and reclaiming land and is most satisfactory for making and deepening waterways, levee building, canal and ditch construction. We can furnish hydraulic dredges capable of excavating any material except ledge rock with capacities up to fifteen hundred yards per hour, either knocked down or afloat.



Our Marine Engines represent the highest type of modern marine construction and design for steam reciprocating propelling engines. We build propelling units complete, including condenser, thrust bearing, shafting and propeller.

Correspondence Solicited.

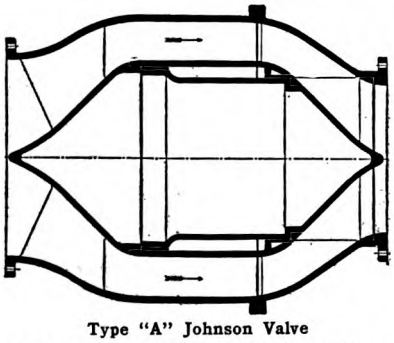
Digitized by Google

THE LARNER-JOHNSON VALVE & ENGINEERING COMPANY

WIDENER BLDG.

PHILADELPHIA, PA.

Johnson Hydraulic Valves. Johnson Differential Surge Tanks



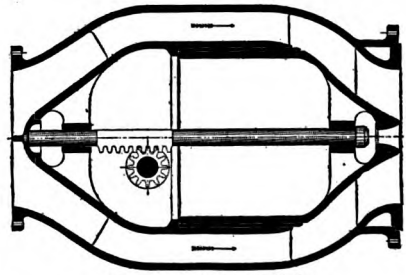
Type "A" Johnson Valve

TYPE "A" JOHNSON VALVES are designed especially to suit the requirements of water power plants. They are not intended for throttling.

They may be operated from a distance hydraulically or electrically, require no auxiliary power for operation, do not have to be by-passed and will close automatically in case of a break in the system beyond the valve. All parts are circular and, therefore, not subject to distortion under pressure. The plunger is ground to fit the seat and is absolutely tight when closed. No packing is used on the plunger and there are no delicate internal parts to wear or get out of order.

The plunger is operated by an external control valve which exhausts pressure from the internal chambers of the main valve and opens or closes the plunger. The control valve is operated locally by hand or from a distance by hydraulic or electric means. The control automatically cracks the plunger open slightly to prime the empty system before opening the valve wide and damps the end of the closing stroke to prevent water hammer under all conditions.

TYPE "C" JOHNSON VALVES are adapted to general use under high and low pressures. They are operated by hand or electrically.



Type "C" Johnson Valve

This valve has an internal control valve operated by a rack and pinion and is so designed that the plunger moves with the control valve without transmitting any load to the control mechanism. The time of opening or closing may be varied at will by the operator and the plunger may be held with precision at partial openings. It is the ideal valve for throttling, being entirely free from vibration or erosion.

THE JOHNSON DISCHARGE REGULATOR is similar in design to the Type "C" Valve and is adapted particularly to so-called "free-discharge" conditions. This Regulator will discharge a jet into the air under any head without danger of vibration or erosion. It is built in all sizes to suit requirements and may be operated either by hand or electricity. It may be set for any position between open and closed and will not drift. It may be arranged by means of float switches to maintain automatically the level of a pond either above or below the Regulator.

The Johnson Discharge Regulator is the ideal device for reservoir outlets in connection with water works, irrigation projects and water power plants.

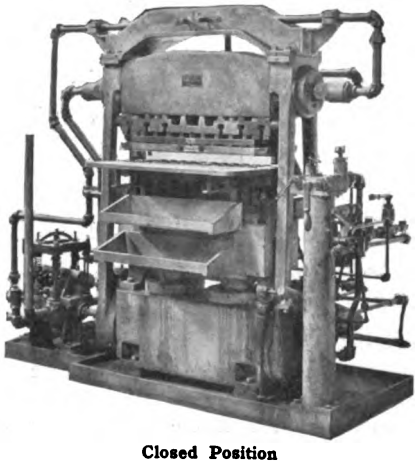
For full information send for Bulletin 2A.

Digitized by Google

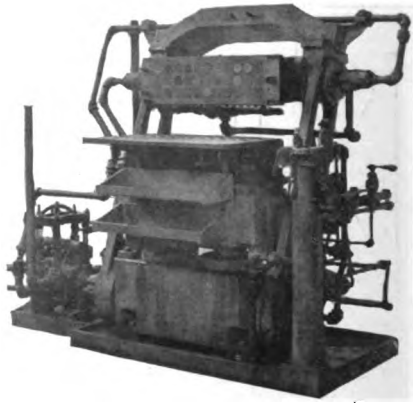
THE CHARLES BURROUGHS CO.

NEWARK, N. J.

Designers and Builders of Hydraulic Machinery
Hydraulic Presses for Production Molding Our Specialty



Closed Position



Open Position

TILTING HEAD PRESS WITH MULTIPLE CAVITY MOLD

590

Press patented July 1, 1919. Other patents pending
Molds patented Feb. 2, 1915; July 20, 1920. Other patents pending

HYDRAULIC PRESSES:

Rodless Type (Patented):

Rigid, compact, simple. No rods to stretch or nuts to work loose. Absolutely parallel surfaces maintained between platens.

Rod Type:

All sizes and any number of platens. We require sizes and nature of material you propose to press before we can quote.

Special:

Hubbing presses.
Dehydrating presses.
Extruding presses.
Semi-automatic molding presses.
Angle molding presses.
Tilting head molding presses.
Record molding presses.
Hydraulic sheeting planers.

HYDRAULIC PUMPS:

Plain hand, high and low pressure hand, belt or motor driven, 2, 3, 4, and 6 plunger with accumulator stop. Automatic change high and low pressure.

HYDRAULIC ACCUMULATORS:

Weighted with cast iron weights. Inverted, tank type weighted with scrap, sand, stone, etc.

HYDRAULIC VALVES AND FITTINGS, STEAM PLATES:

Cast iron, bronze, and steel drilled from solid.

MOLDS:

For every known material. Pyroxylin, shellac, bakelite, condensite, etc.

Steam, gas, and electrically heated.

Send for our special catalogue.

Digitized by Google

CHARLES F. ELMES ENGINEERING WORKS

Established 1861

215 N. MORGAN ST., CHICAGO, ILL.

Manufacturers of Hydraulic Equipment



HYDRAULIC PRESSES:

FOR

Abrasive Wheels	Laboratories
Arbors	Lead Extruding
Asphaltum Oil	Lead Pipe
Auto Bodies	Lead Traps
Bending	Leather Belting
Briquetting	Leather Stretching
Broaching	Locomotive Crank-pins
Bulldozing	Macaroni
Carbon Extruding	Metal Drawing
Carbon Slugs	Metallic Caskets
Crankpins	Mica
Cold Moulding	Paste Goods
Die Sinking	Pulling
Dough	Silver Refining
Drawing	Solder
Embossing	Starch
Extruding	Steel Forming
Fertilizing	Straightening
Flanging	Tile (Mosaic)
Forcing	Tire Mounting
Forging	Trunks
Forming	Veneers
Graphite Extruding	Vulcanizing
Grease	Wheel Forcing
Hot Moulding	Wool Baling
Insulating Material	



ACCUMULATORS:

For various kinds of ballast.

HYDRAULIC HIGH DUTY PUMPS:

Vertical and Horizontal Pumps to 18 inch Stroke.

HYDRAULIC OPERATING VALVES:

Quick acting for either one or two pressure systems.

DROP FORGED STEEL HYDRAULIC FITTINGS:

SPECIAL MACHINERY:

Complete Plants designed, built and installed.

No work too small or too large to handle.

Slight changes in standard patterns save the cost of designing.

Digitized by Google

GALLAND-HENNING MFG. CO.

MILWAUKEE, WISC.

Builders of ACME Hydraulic Products

HYDRAULIC PRESSES:

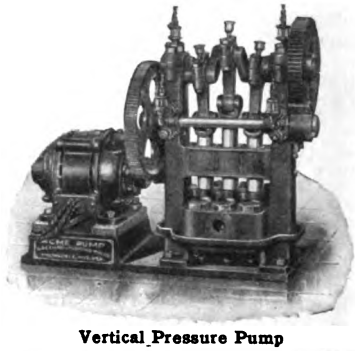
For all purposes.



Duplex Double Acting Pump

PUMPS:

High Pressure Vertical, Horizontal, and Double Pressure Pumps. Low Pressure for boiler feeds, tanks, oiling systems, etc.



Vertical Pressure Pump

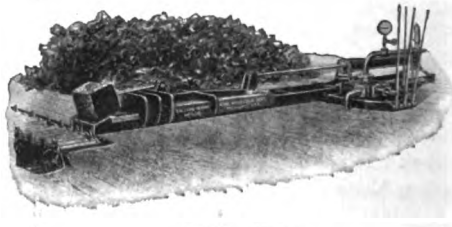
BALING PRESSES:

We build ACME Doorless Balers for Waste Paper, Rags, Cotton, Shoddy, etc.

Also for finished textiles.

SCRAP METAL COMPRESSES:

For scrap steel, copper, brass, aluminum stampings, etc., also soft metal turnings.



Baling Press

MALTING MACHINERY:

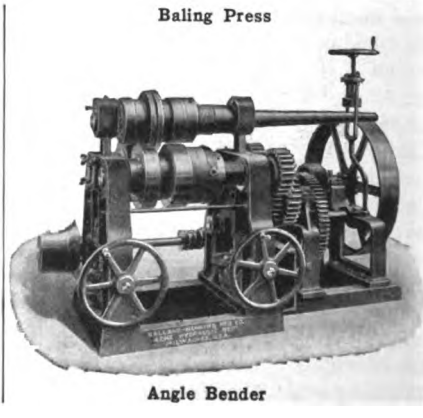
Pneumatic Drum and Compartment Systems.

DRYING EQUIPMENT:

For Grains, Starch, Glucose, Fruit Pomace, etc.

ANGLE BENDERS:

For Angles, Tees, Channels, Beams, Bars, Flats, Pipe, etc.



Angle Bender

Digitized by Google

THE HYDRAULIC PRESS MFG. CO.

MAIN OFFICE AND WORKS: MOUNT GILEAD, OHIO

BRANCH OFFICES:

NEW YORK BUFFALO CLEVELAND DETROIT SAN FRANCISCO

HYDRAULIC EQUIPMENT:

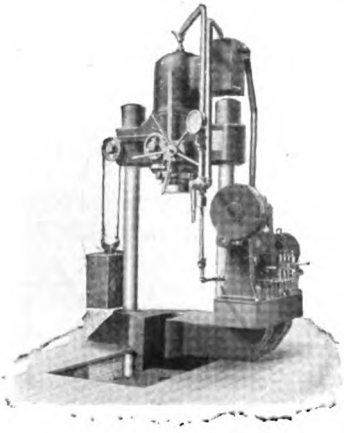
The Hydraulic Press Mfg. Co. manufactures hydraulic equipment for all high pressure purposes. Engineers are invited to use the facilities of our engineering department in the planning and selecting of hydraulic equipment.

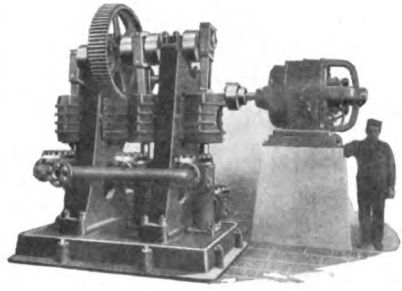
HYDRAULIC ACCUMULATORS:

H-P-M Accumulators are designed in two main types, stationary cylinder and moving cylinder types. The stationary cylinder type has two kinds of platforms. One platform is made of structural steel for loading with concrete and one cast for holding a tank. The tank is loaded with sand, steel scrap, punchings or other loose materials. The moving cylinder type is made with cast platform only. Our accumulator line is complete and contains over 500 different types and sizes.

HYDRAULIC PRESSES:

Upward, Downward and Horizontal Pressure Types. Built with a wide range of pressures. Forming and Forcing Presses, Electrode Presses, Arbor Presses, Briquetting Presses, Hot and Cold Plate Presses, Salt Presses, Powder Presses, Wheel Presses, Straightening Presses, Curb Presses, Fruit Presses, Veneer Presses, Embossing Presses, Lead Molding Presses.





HYDRAULIC PUMPS:

Hand, Belt, Steam and Motor Driven Pumps. Designed with high and low pressure plungers, automatic knock-out valves and other special features.

HYDRAULIC VALVES:

H-P-M Valves are made of special grades of bronze and steel. Our designs include automatic valves, check valves, safety valves for either high or low pressure; also single-acting valves of the two or three way type and double-acting valves of the four or five way type controlled by one lever.

SPECIAL PRESSES:

Our many designs and skilled engineering department enable us to build many special presses for unusual purposes.

Catalogs and other information submitted on request.

Digitized by Google

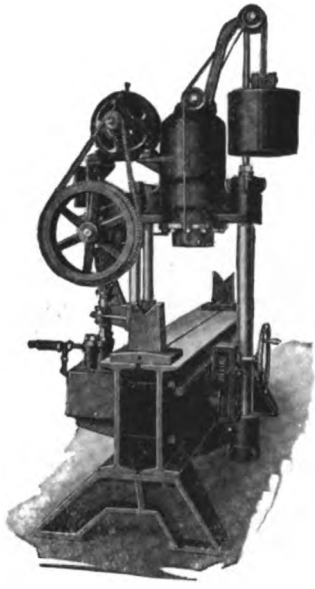
METALWOOD MANUFACTURING CO.

DETROIT, MICHIGAN

Manufacturers of Quick Operating Hydraulic and Hydro-Pneumatic Machinery

HYDRAULIC STRAIGHTENING PRESSES:

In 35-ton, 50-ton, 65-ton and 125-ton capacities for straightening 3 in. to 6 in. bars and shafts, including our No. 191 Crankshaft Press designed especially for crankshaft straightening.



HYDRO-PNEUMATIC QUICK OPERATING PRESSES:

In 10-, 15-, 20-, 30- and 40-ton capacities for light straightening, broaching, forcing and assembly operations:

HYDRAULIC PRESSES:

For vulcanizing and forming in rubber manufacture; leather and coin embossing; metal and plastic material forming presses.

HYDRAULIC ARBOR PRESSES:

In 35-, 60- and 100-ton capacities for industrial and railroad shop work.

HYDRAULIC BROACHING PRESSES:

In accumulator or belt driven types.

HYDRAULIC FORCING AND ASSEMBLY PRESSES:

Horizontal style, Quick Operating types, for rear axle housing and brake drum work.



ACCUMULATORS:

In four types and wide range of capacities for all various requirements.

HYDRAULIC HIGH DUTY PUMPS:

In Horizontal and Vertical types and in capacities 2½ to 30 gals.



HYDRAULIC ALLEVIATORS, INTENSIFIERS:

Flanges, pipe and pipe bends, valves, etc., including "Metalwood" Quick Operating type.

DROP FORGED STEEL HYDRAULIC FITTINGS:

Ells, tees, stop and check valves, flange unions, couplings, bushings, etc.

CAST STEEL HEAVY HYDRAULIC AND STEAM FLANGED FITTINGS:

Ells, Tees, Crosses and Flanges.

Bulletins upon Application.

METALWOOD

REG. U. S. PAT. OFF.

Digitized by Google

JOHN ROBERTSON & CO.

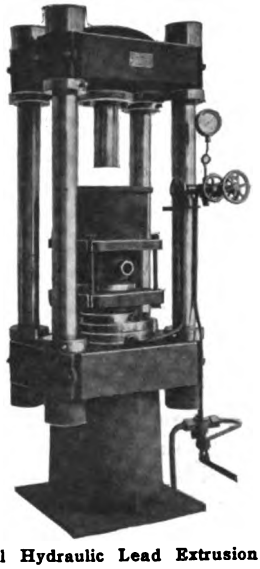
(TUBAL CAIN IRON WORKS)

133 WATER ST., BROOKLYN, NEW YORK

Manufacturers of Hydraulic Presses and Hydraulic Pressure Pumps



High Pressure Hydraulic Pumps. 1000 Lbs. to 8000 Lbs. Per Square Inch

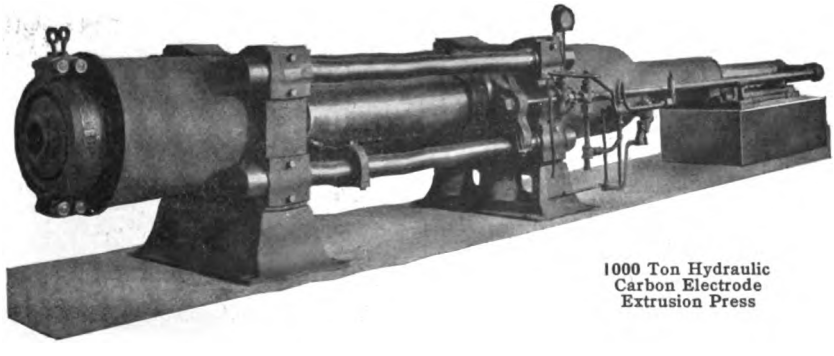


Vertical Hydraulic Lead Extrusion Press

MANUFACTURERS OF:

Hydraulic Pressure Pumps.
Hydraulic Accumulators.
Hydraulic Valves and Fittings.
Lead Pipe Machinery.
Block Tin Pipe Machinery.
Lead Trap Machinery.
Solder Wire Machinery.
Sheet Lead Machinery.
Lead Incasing Presses.

Hydraulic Embossing Presses.
Electrotype Moulding Presses.
Jewelers' Presses.
Silversmiths' Presses.
Hydraulic Compression Test Presses.
Celluloid and Bakelite Presses.
Electric Carbon Presses.
Carbon Electrode Presses.
Hydraulic Bending Presses.
Hydraulic Forging Presses.



1000 Ton Hydraulic Carbon Electrode Extrusion Press

Digitized by Google

THE WATSON-STILLMAN CO.

35 CHURCH ST., NEW YORK

Engineers and Builders of Hydraulic Machinery—Pumps, Valves, Accumulators, Intensifiers, Boosters, Jacks, Pitjacks, Lifts, Punches, Shears, Benders, Straighteners, Riveters, Coping Shears, Bolt Forcers, Baling Presses, Bulldozers, Forging Presses, Metal Extrusion Presses, Forcing Presses, Tunnel Shield Cylinders and Equipment, Etc.

In our long experience of 70 years, we have designed, built and have patterns for over 5000 complete hydraulic machines for practically every use to which hydraulic pressure has been found adaptable.

HYDRAULIC PRESSES:



We have a standard line of presses for forcing, force fitting, assembling; presses for broaching, metal forming, metal extruding; presses for die sinking, die forming, embossing; presses for baling metal scrap, cloth, etc.; presses for briquetting of granular materials; presses for forging, drawing, tube drawing; heating presses and chilling presses for forming rubber and composition goods in molds.

HYDRAULIC ACCUMULATORS:

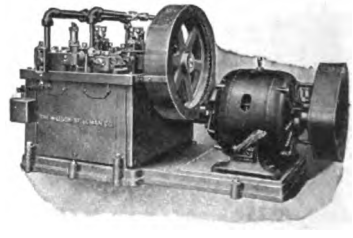


Tank Weighted Accumulator

We build accumulators in seven types, plain cylinder, inverted cylinder, yoke cylinder, plain and variable pressure, differential ram, hydro pneumatic and intensifier.

HYDRAULIC PRESSURE PUMPS:

We have given particular attention to the appurtenances necessary to complete hydraulic plant installation. Our line of pumps is complete and contains a standard type for every pressure demand up to 10,000 lbs. per sq. in. and every detail has been worked out to give the maximum of efficiency.



We are prepared to design special equipment to suit your own specifications.

Digitized by Google

Hydraulic Machinery, Valves, C. I. Pipe, Fire Hydrants, Etc.

R. D. WOOD & COMPANY

PHILADELPHIA, PA.

Engineers, Iron Founders, Machinists

HYDRAULIC MACHINERY:

Hydraulic Accumulators and hydraulic Presses of every description for:

Boiler and Plate shops
Car shops
Railroad shops
Steel mills
Ship yards
Rubber and Tire factories
Powder plants, etc., etc.

HYDRAULIC OPERATING VALVES:

Designed for five hundred to thirty-five hundred pounds working pressure of the leather packed piston or double spindle type. Also stop-check and shock relief valves.

AUTOMATIC GAS PRODUCERS:

Gasifying 40 to 50 tons of bituminous coal per 24 hours in continuous operation, for:

Open hearth furnaces
Soaking pits
Heating furnaces
Glass tanks
Lehrs
Smelting furnaces
Lime kilns
Brick kilns, etc., etc.

CAST IRON PIPE:

Bell and Spigot Pipe from 1 inch to 84 inches in diameter, Flange Special deep bell, High Pressure, Flexible Joint



for Submarine Work, Standard and Special Fittings, Heavy Loam and Dry Sand Castings.

GENERAL MACHINERY:

Our shops are well equipped for building large machinery of every description, such as sugar, chemical and similar work.

IRON CASTINGS:

We are especially well equipped for making large and intricate loam castings; also castings in dry sand and green sand.

HYDRANTS AND VALVES:

Fire Hydrants, Mathews patents for standard and high pressure. Gate, Check, Foot and Air Valves, Valve Boxes, Indicator Posts, Foot Valve and Intake Screens, Hood Racks, etc.

Digitized by Google

THE BONNOT COMPANY

CANTON, OHIO

Manufacturers of Brick Machinery, Portland Cement Machinery, Powdered Coal Equipment and Ore Grinding Machinery

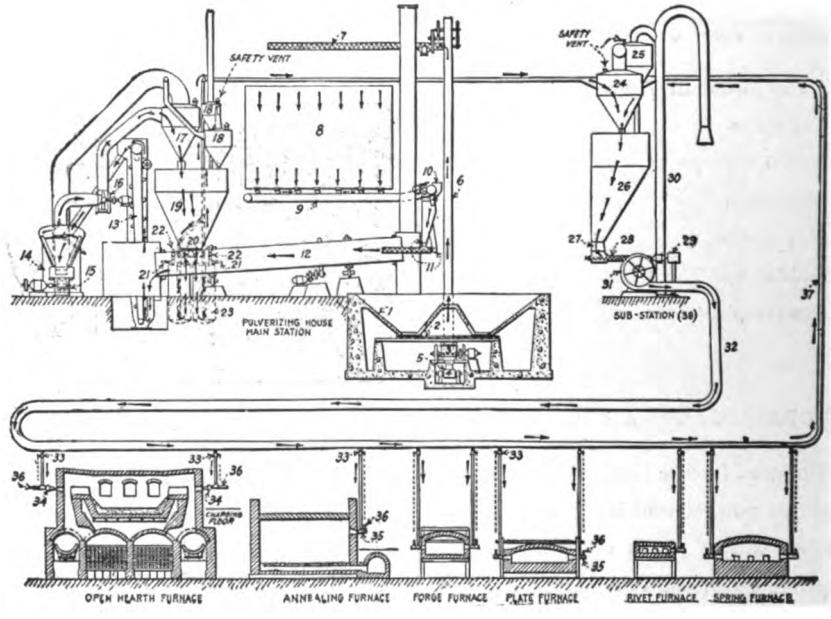


Diagram of a Holbeck Pulverized Coal Installation

HOLBECK PULVERIZED COAL SYSTEMS:

Central fuel storage, pneumatic distribution, for use in many types of furnaces, including boilers, cement kilns, and metallurgical furnaces.

PORTLAND CEMENT MACHINERY:

Rotary kilns, dryers, pulverizers, tube mills, ball mills,

BRICK AND TILE MACHINERY:

Building Brick, Paving Brick and Hollow Clay Products.

BONNOT PULVERIZERS:

For grinding limestone, coal, etc., either with or without air separator.

BALL MILLS:

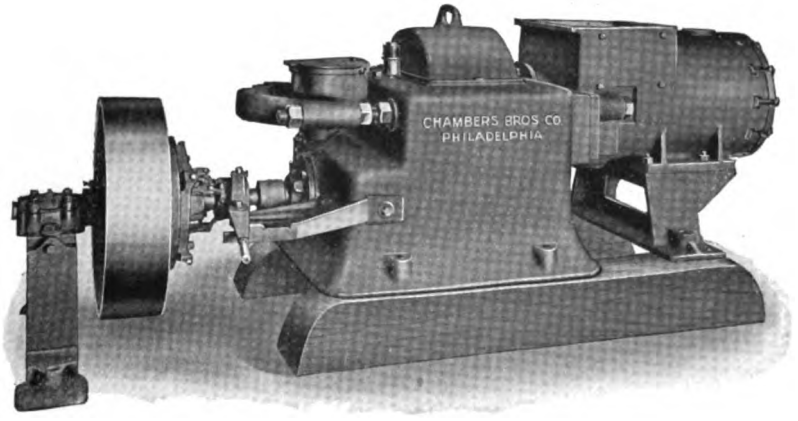
For grinding ores.

Digitized by Google

CHAMBERS BROTHERS COMPANY

PHILADELPHIA, PA.

Manufacturers of Clay Working Machinery, Brick Making Machinery, Brick Represses, Roller Crushers



Number 60 Extruding Machine

AUGER MACHINES:

For moulding and for compressing plastic materials.

This particular machine has steam jacketed barrel, cast steel auger, forged steel die plate drilled with a large number of ⅜ inch holes. The provision for end thrust is most liberal. Driving gears of steel with cut teeth and encased for constant lubrication. Friction clutch driving pulley 20 x 6 inches. Unboxed weight about 3550 pounds. Other patterns of barrel and of dies will be made to order.

We specialize on:

CLAY WORKING MACHINERY

BRICK MAKING MACHINES

BRICK REPRESSES

ROLLER CRUSHERS

Digitized by Google

STURTEVANT MILL COMPANY

MAIN OFFICE AND FACTORY, HARRISON SQ., BOSTON (22), MASS.

NEW YORK
Singer Building

CHICAGO
People's Gas Building

ATLANTA
Healey Building

CRUSHERS:

Jaw, Rotary, Sledge and Roller Types for coarse, intermediate and fine reduction of hard or soft materials. Many sizes.

ROLLS:

For Crushing, Granulating, Pulverizing, Grinding. Many sizes.

PULVERIZERS:

Ring-Roll, Roller, Emery, Swing Sledge, Hinged Hammer, Disc, Stone and Laboratory. High or low speed for soft, medium, or hard, tough or fibrous materials. Many sizes.

SCREENS:

Inclined, Vibrating, Bumping, Shaking, Revolving and Laboratory. Many sizes.

AIR SEPARATORS:

For 60 mesh or finer. Many sizes.

600 **ELEVATORS:**

Vertical, Inclined, Open, Housed, Belt, Chain, Continuous, Centrifugal and special.

CONVEYORS:

Screw, Belt, Slat, Drag, Apron, Stationary and Portable.

MIXERS:

Batch for dry materials.

AUXILIARIES:

Chutes, Spouts, Bins, Hoppers, Feeders, Valves, Scales, Connections, Transmission, etc., etc.

COMPLETE UNITS READY TO ERECT:

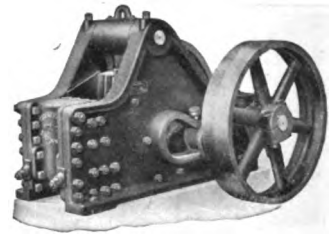
Consisting of above or similar machinery with all connections, transmission, bins, valves, etc.

COMPLETE FERTILIZER PLANT UNITS:

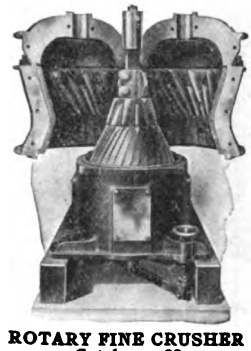
For grinding Rock, Tankage, Bone, etc. For Mixing, Shipping, Unloading and Handling.

COMPLETE PLANTS (using above types of machinery) Designed, Equipped, Supervised, Erected and Operated.

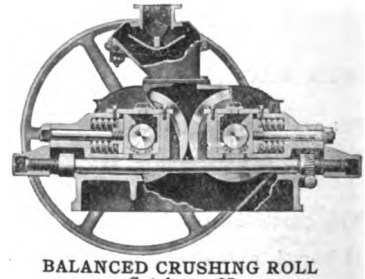
CONSULTING ENGINEERS



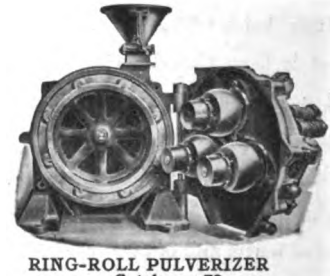
JAW CRUSHER
Catalogue 62



ROTARY FINE CRUSHER
Catalogue 63

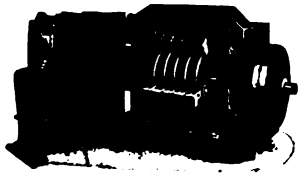


BALANCED CRUSHING ROLL
Catalogue 65

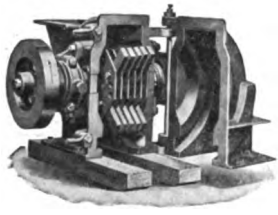


RING-ROLL PULVERIZER
Catalogue 79

Digitized by Google



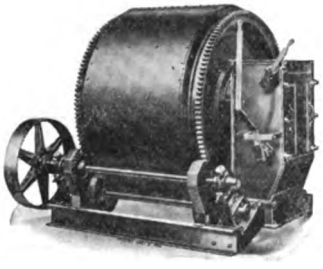
SWING-SLEDGE MILL
Catalogue 84



HINGED-HAMMER PULVERIZER
Catalogue 84



VERTICAL ROCK-EMERY MILL
Catalogue 84



FERTILIZER MIXER
Catalogue 80



BELT CONVEYOR
Catalogue 61



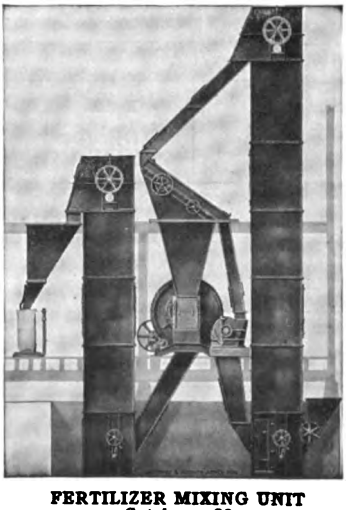
STEEL ELEVATOR
Catalogue 61



VIBRATING SCREEN
Catalogue 77



AIR SEPARATOR
Catalogue 87



FERTILIZER MIXING UNIT
Catalogue 86

Digitized by Google

WILLIAMS PATENT CRUSHER AND PULVERIZER CO.

PLANT AND GENERAL OFFICES: ST. LOUIS, MO.

Manufacturers of Crushing, Grinding and Shredding Machinery

BRANCH OFFICES: NEW YORK, CHICAGO, SAN FRANCISCO, PHILADELPHIA, PITTSBURGH, DETROIT, RICHMOND, VA., CLEVELAND, BUFFALO

COAL CRUSHERS FOR COKE OVEN WORK, BY-PRODUCT AND BEEHIVE OVENS:



By the use of the Williams Patent Hammer Crushers with the various adjustable features, the following results are obtained from the ovens: The oven pulls easier, more coke is made from each oven, the ash is reduced, the coke comes out firm, regular in size, does not crumble, and the structure is much improved.

602

The substantial construction of these machines is plainly shown in this cut; all parts subjected to wear are easily adjustable, which includes the hammers, the discs, the cage bars, and the breaker plates. The housing is entirely protected from wear by heavy liner plates made of heavy chilled iron. The machine is very accessible, as it is made of sectional construction.

CRUSHERS FOR ANTHRACITE MINE REFUSE:

Our Patent Hinged Hammer Debris Crushers are in extensive use for properly crushing and treating Anthracite debris or Culm before flushing it into the mines.

CRUSHERS FOR CHAIN GRATES OR STOKERS:

The Williams Patent Coal Splitter takes Run-of-Mine Coal and reduces the same to 1½", 1¼", 1", ¾" and finer with the *"mimimum amount of fine dust"* the *only* machine made that can be *regulated* to properly *size coal.* All parts are *adjustable* to *wear;* the crusher is also *adjustable* to give most *any* size coal *desired.*

We also crush Coal and Pitch for Briquette Plants—for Coal Washers, before and after washing, and make a specialty of sizing Coal for all Commercial purposes.

SPECIFICATIONS REGULAR COAL CRUSHER

Size Mill	Hopper Opening In.	Size Feed	Capacity Tons per Hour ½" & finer	¼" & finer	⅛" & finer	Speed R. P. M.	Size Pulley Dia.	Face	Extreme Dimensions L'gth	W'th	H'g	Horse Power	W'ght P'nds
1	15x12	Run of Mine	30– 40	25– 30	20	1000	20"	10½"	6'	6'6"	3'9"	20–25	6500
2	20x12		45– 55	40– 50	30– 40	1000	20"	15"	6'	7'6"	3'9"	30–35	7500
3	30x16		65– 80	60– 70	45– 60	1000	20"	15"	6'	8'6"	3'9"	50–60	9500
4	40x18		100–115	80– 90	60– 80	1000	20"	18"	6'	9'0"	3'9"	75–80	10500
5	50x20		120–140	100–110	75–100	1000	20"	20"	6'	9'6"	3'9"	100	12000
6	60x20		150–175	115–130	100–120	1000	20"	22"	6'	11'0"	3'9"	125	16200

JUMBO SPECIFICATIONS

5	30x24	R.O.M.	150–175	120–140	80–100	750	24"	18"	8'10"	9'	5'4"	85–100	20000
6	36x24		180–200	145–165	120–140	750	30"	20"	8'10"	10'	5'4"	140–150	24000
7	48x30		225–250	200–220	150–175	750	30"	24"	8'10"	11'	5'4"	165–185	28000
8	60x30		275–300	250–275	180–200	750	30"	26"	8'10"	13'	5'4"	200–250	30000

BRIEF SPECIFICATIONS STOKER COAL CRUSHER

No. of Crusher	Hopper Opening, Inches	Weight	Horse Power	Capacity—Tons per Hour R. O. M. to 1½" and Finer
1	15x18"	6500	15 to 20	25 to 40
2	20x24"	7200	20 to 25	50 to 60
3	30x24"	9500	40 to 50	75 to 100
4	40x24"	10500	60 to 75	100 to 125
5	50x24"	12000	85 to 100	135 to 175
6	60x24"	16200	100 to 125	180 to 220

Digitized by Google

WILLIAMS PATENT CRUSHER AND PULVERIZER CO.
ST. LOUIS, MO.

RAW MATERIAL GRINDERS FOR CEMENT AND GYPSUM PLANTS:

UNIVERSAL MILL



This *Universal Grinder* is the *only* machine of its kind made. Will take DRY 2″ Limestone, Shale, Clay, or Coal, and deliver at one operation a product 95% through 20 mesh TUBE MILL FEED WITHOUT OUTSIDE SCREENS OR SEPARATORS. *No other* machine can deliver the fine uniform product year in and out.

VULCANITE RE-CRUSHER

These Vulcanite grinders will take raw material, limestone, shale, clay or coal in cubes of 3 inches and under, and reduce the same to ½ inch or ¼ inch. This makes an excellent feed for those plants which use roller mills as finishers in the raw end.

We issue the following catalogs:

No. 45-E, Coal Crusher Catalog—For all those crushing and grinding coal, etc.

No. 45, Cement and Limestone Catalog—Limestone, Gypsum and Similar Grinders.

No. 45-B, Fertilizer Catalog—Bone, Tankage, Shells and Fertilizer Work.

No. 45-A, Clay Catalog—Clay, Shale, etc., for Brick, Tile and Terra Cotta.

No. 45-C, Oil Cake Catalog—Linseed, Cottonseed and Similar Oil Cake Grinders.

No. 45-F, Shredder Catalog—Bark, Chips, Cork and all Fibrous Materials.

No. 45-D, Stock Food Catalog—All Cereals for Feed Millers, Alfalfa, etc.

603

Mention material you wish to crush or grind and we shall see that you receive the proper catalog and specifications.

COMPLETE SPECIFICATIONS UNIVERSAL MILLS

Size Mill	Size Feed	Diam. Mill	Capacity per Hour Dry Stone Tons		Speed	Horse Power	Floor Space Extreme Dimensions			Size Pulley		W'ght
			12 Mesh	20 Mesh	R.P.M.		L'gth	Width	H'ght	Diam.	Face	P'nds
0	1 ″	18″	¾	½	1800	10– 12	5′	5′ 1″	3′2″	8″	8½″	2500
1	1½″	26″	2– 4	1– 3	1600	15– 20	6′3″	5′10″	3′8″	16″	10½″	4000
2	1½″	26″	5– 6	3– 5	1600	20– 25	6′3″	6′ 3″	3′8″	16″	12½″	5000
2xx	2 ″	26″	6– 8	5– 6	1600	30– 35	6′3″	7′	3′8″	16″	15 ″	6500
3	2 ″	40″	10–12	8–10	1100	50– 60	7′6″	6′10″	5′4″	20″	15 ″	12000
4	2½″	40″	13–15	10–13	1100	65– 75	7′6″	7′10″	5′4″	20″	18 ″	14000
5	2½″	40″	16–20	15–18	1100	80–100	7′6″	8′ 6″	5′4″	20″	20 ″	16500
9	3 ″	60″	25–35	20–30	750	150–175	12′	9′ 2″	7′2″	30″	30 ″	30000

VULCANITE SPECIFICATIONS

Size Mill	Hopper Opening	Size Feed	Capacity Tons per Hour			Speed	Horse Power	Extreme Dimensions			Size Pulley		W'ght
			½″	⅜″	¼″	R.P.M.		L'gth	Width	H'ght	Diam.	Face	P'nds
1	14′x 5″	1½″	4	3	2	1500	15– 18	4′8″	6′3″	3′3″	16″	10½″	4200
2	18′x 6″	2 ″	7	5	3	1500	20– 25	4′8″	6′6″	3′3″	16″	12½″	5000
2xx	24″x 6″	2 ″	10	8	6	1500	30– 35	4′8″	7′	3′3″	20″	15 ″	6000
3	18″x 8″	2½″	20	18	15	1000	40– 50	5′2″	7′	4′	20″	15 ″	10000
4	24″x 8″	3 ″	30	27	25	1000	70– 75	5′2″	7′4″	4′	20″	18 ″	12000
5	30″x 8″	3 ″	35	30	28	1000	90–100	5′2″	8′	4′	20″	20 ″	14000
6	36″x10″	3 ″	40	35	30	1000	110–125	5′2″	9′	4′	20″	22 ″	15500
7	40″x10″	3 ″	50	42	35	1000	115–150	5′2″	9′6″	4′	22″	24 ″	17500

Digitized by Google

F. L. SMIDTH & CO.

Engineers

50 CHURCH ST., NEW YORK

PRODUCTS:

Engineering:
- Cement Making Factories
- Pulverized Coal Installations
- Nodulizing of Ores

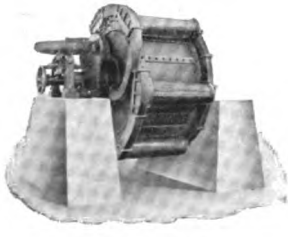
Manufacturers:

Kominuter	Tubemill
Trix	Lenix Belt Drive
Washmill	Agitators
Exbinner	Slurry Pump
Slurry Feeder	Dry Feeder
Cooler	Kiln
Danish Flint Pebbles	Cylpebs (metallic grinding bodies)
Silex Linings	Metal Linings



DESIGN, EQUIPMENT AND ERECTION

of Portland cement making factories.



KOMINUTER

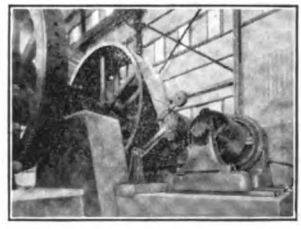
for wet and dry granulating.



TUBEMILL

for wet and dry pulverizing.

SEE OUR ADVTS. IN MECHANICAL ENGINEERING THE JOURNAL OF THE A.S.M.E.



THE LENIX

makes belt drives with short pulley centers as efficient as direct connected units, chain or gear drives, saving space, slippage, cost of belts and upkeep.



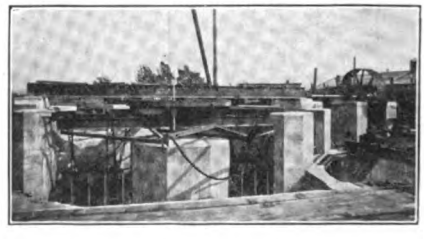
THE TRIX

for grading granulated materials in a wet state.



SLURRY PUMP

The economical method of transporting heavy liquids, like slurry



WASHMILL

for disintegrating and mixing clay and like materials in water.

Digitized by Google

L. O. KOVEN & BROTHER

OFFICE: 154 OGDEN AVE., JERSEY CITY, N. J.

N. Y. WAREROOMS
50 Cliff Street, NEW YORK CITY

WORKS
JERSEY CITY, N. J.

Engineers, Manufacturers, Machinists and Designers. We fabricate Plate Steel, Copper, Brass, Tin, Aluminum, etc., of any shape. Designers and Makers of Special Apparatus for Manufacturing Industries

We are prepared to do plate work of every description for Ships, Mills, Mines, Factories, Plantations, Chemical Works, Paint Works, Paper Mills, Abattoirs, Fertilizer Plants, Water Works, Government Work, Sewage Systems, etc., We also make and design Special Apparatus and Machinery to meet the progress in all lines of business. WE HAVE THE FACILITIES FOR IMPROVING YOURS.

A Partial List of What We Make:

Air Receivers
Air Washers
Acid Tanks—Tubs or Vats
Barbers' Hot Water Boilers
Bottle Sterilizers
Can Washers
Canned Goods Sterilizers
Chemical Apparatus
China Kilns
Coil Boilers
Creosoting Tanks
Digesters
Dredge Pipe
Drying Apparatus
Exhaust Manifolds
Extractors
Filter Presses
Fruit Washers
Galvanized Tanks
Galvanizing Works
Gasoline Tanks
Gasometers
Glass Kilns
Glue Dissolvers
Ham Boilers
Hot Water Tanks
Humidifiers
Jacketed Tanks
Kilns
Lead Lined Tanks
Melting Pots
Metal Melting Furnaces
Mixers—All Kinds
Mixing Pans
Mufflers
Oil Filters
Pasteurizers
Percolators
Pipe (Riveted)
Plating Tanks
Rubber Lined Tanks
Sand Blast Tanks
Smoke Stacks
Steam Kettles
Steel Sinks
Sterilizers
Stills
Tanks (Air, Gas, Oil & Water)
Tar Kettles
Tumblers
Vacuum Pans
Varnish Tanks
Vulcanizers
Wash Basins for Factory
Washers for Canneries
Water Stills

Digitized by Google

J. P. DEVINE COMPANY

1375 CLINTON STREET, BUFFALO, NEW YORK

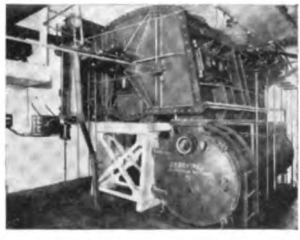
50 East 42nd Street
NEW YORK CITY

Jas. Livingston, Ltd.
LONDON, ENGLAND

Manufacturers of Vacuum Drying, Evaporating, Impregnating, and Chemical Apparatus, Condensers, Vacuum Pumps

VACUUM DRUM DRYERS:

For Dyewood and Tanning Extracts, Milk and Food Products, Pastes, etc. This type of machine affords a rapid and uniform drying because the drum takes up but a very thin film of the wet material. The water is then evaporated from the material, leaving the dried sub-



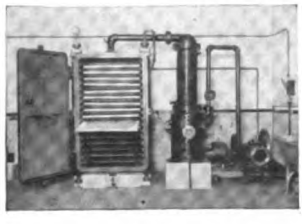
Devine Vacuum Drum Dryer

stance on the drum to be taken off by our improved method. The drying process is continuous and independent of climatic conditions, free from dust, and uniform. Adapted for all solutions and liquors containing solids.

606

VACUUM CHAMBER DRYERS:

For Colors, Dyes, Extracts, Salts, Rubber, Smokeless Powder and High Explosives and other Chemicals and Food Products. Materials which are difficult to dry in the atmosphere without decomposition can be handled rapidly and effi-



Devine Vacuum Drying Chamber with Surface Condenser and Vacuum Pump

ciently in this type of dryer without any danger of impairing their qualities. The Vacuum Drying Chamber is designed to remove the water rapidly and at a low temperature, assuring uniform drying and low operating cost. Best suited for all materials that can be handled on trays or pans.

VACUUM PUMPS—all sizes and capacities, high efficiency units, steam, belt or motor driven.

CONDENSERS—Jet and Surface Types.

DIGESTORS, EXTRACTORS, STILLS, FILTERS, WASHERS, PERCOLATORS.

SOLVENT RECOVERY APPARATUS. TANKS of all descriptions.

VACUUM ROTARY DRYERS:

For Starch, Granular Substances and Chemical Products. The moist material is charged into the dryer and by means of a high efficiency

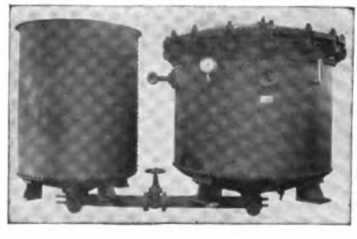


Devine Rotary Vacuum Drying Apparatus

Dry Vacuum Pump and Condenser, furnished as part of the unit, a high vacuum is produced, the vapor being pulled over into the condenser and condensed. Concentric with steam-jacketed outside cylinder is a revolving drum, heated by live or exhaust steam, to which stirring blades are attached. Material to be dried is between the inside drum and outside cylinder, kept in constant motion by the stirring blades. Thus, every particle comes into intimate contact with the heating surfaces, periodically, and a thorough, even drying results. Designed for all material that can be tossed or mixed in the drying.

IMPREGNATING APPARATUS:

For Armature, Field, Magnet and Transformer Coils, Power and Telephone Cables, Piano Sharps, Pencil Slats and other Wood Products,



Devine Impregnating Apparatus

Leather Fabrics, etc. This is a combination vacuum drying and impregnating apparatus, the coils or material to be handled first being dried under vacuum, thereby removing both air and moisture from the interior as rapidly as from the surface. The compound is then drawn into the impregnating tank, and penetrates to the innermost recesses of the material, and to render this penetration more thorough, air at artificial pressure is admitted into the Impregnation Tank above the surface of the compound.

Digitized by Google

J. P. DEVINE COMPANY — BUFFALO, N. Y.

AUTOCLAVES:

All sizes and capacities, of cast steel for high pressure, also of bronze, copper, etc., equipped with or without stirring device, thermometer, pressure and safety valves and all necessary openings in cover.



High Pressure Steel Autoclave

Autoclaves built in units having a holding capacity of ¼ gallon to 250 gallons, and for working pressure up to 1000 lbs.

NITRATING, SULPHONATING AND FUSION KETTLES:

All sizes and capacities made of all materials for any requirement.

These units built with or without stirring device, and supplied with or without reflux condensers.

Units also arranged for heating with fuel oil, gas, or steam jacketed.



Nitrating Kettle

COMPLETE PLANTS BUILT AND INSTALLED:

For the production of Aniline Oil, Benzol, Beta Naphthol, Paranitraniline, T. N. T., Salicylic Acid, H. Acid, Naphthalene, Dimethylaniline, Dimethyldiphenyl Urea, Sulphur Black, all of the coal-tar derivatives, the higher intermediate colors and dyestuffs, etc., etc.

VACUUM PANS, EVAPORATORS:

In single or multiple effect, all sizes and capacities made of cast iron, sheet steel, copper, bronze, etc., with horizontal or vertical tubes, and calandria type.



Devine Vacuum Pan

DIGESTORS, STILLS AND COLUMNS:

Built for the handling of all materials, and arranged for all requirements.



Devine Digestor and Condenser

EQUIPMENT FOR THE CHEMICAL AND ALLIED INDUSTRIES.

CASTINGS FOR THE CHEMICAL TRADE:

CAUSTIC POTS
STEAM JACKETED ACID RETORTS
VALVES AND PIPING
STEAM JACKETED VACUUM STILLS
DEFECATORS VULCANIZERS
MIXING TANKS, ETC.

SPECIAL APPARATUS OF ALL KINDS BUILT BY US.

Let us know the problems you have in mind, and we feel sure our past experience and engineering staff can be of service in the solution of same.

Digitized by Google

LOUISVILLE DRYING MACHINERY CO.

LOUISVILLE, KY.

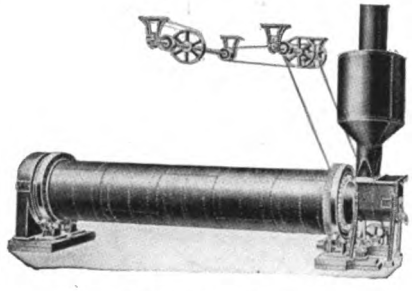
Manufacturers of Evaporators, Dryers and Presses

PRODUCTS: Rotary Dryers, both Steam and Fire; Tankage Dryers, Meal Dryers; Continuous Filtering Machines for pressing Starch Feeds, Brewers' and Distillers' Spent Grains.
Sugar Granulators and Coolers; Single and Multiple Effect Evaporators; Vacuum Pans; Salt Extractors.

LOUISVILLE DRYERS:

The various types and styles of our Dryers are applicable to any materials that can be dried in a Rotary Dyrer.

The Fire Dryers for materials that are not injured by the gases from the furnaces and can stand great heat are of the counter current type.



Direct Steam Dryer

Fire Dryers: Where the materials are not injured by too much heat the heat and materials travel in the same direction. Where the furnace gases are injurious to the materials, we manufacture Indirect Heat Fire Dryers. These Dryers are manufactured in all sizes from 38″ to, and including, 6′ and any length desired. The Fire Dryers are used on any non-combustible materials that must be dried.

The Steam Dryers are for live steam and are built to stand a pressure of 100 lbs. Tubes extend through the entire length and the dryer is relieved of the condensation scientifically and continuously which gives it a capacity much greater than the other types. The dryer is made in all sizes from 38″ to 72″ in diameter and with tubes from 15′ to 25′ long. The dryer is used on all combustible materials, principally for feeds and food, and especially hay, apple pomace, starch, brewers', distillers' and kindred feeds, damp grains, tankage and materials that would be discolored by too much heat and which can be dried on a rotary dryer.

The Sugar Granulators are Indirect Rotary Dryers. The heat is supplied by a steam battery and they are made in sizes from 1500 lbs. to 150,000 lbs. of sugar per day. The dryer is used for all materials that cannot stand a heat above 200, and which can be dried in a rotary dryer.

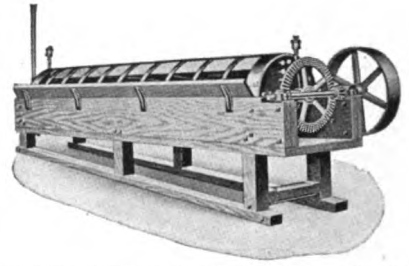
SINGLE AND MULTIPLE EFFECT EVAPORATORS:

We build these of the standard vertical type. They have a large circulating tube in the center. The different sizes range from twenty-four to seventy-two inches in diameter and of any height desired.

VACUUM PANS:

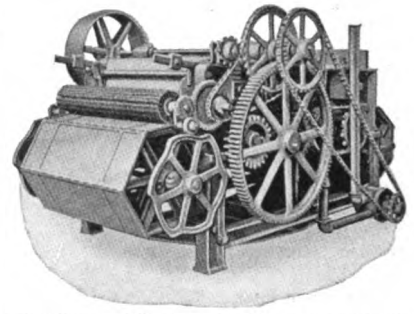
These are of the coil type and range up to and including seventy-two inches in diameter.

MEAL DRYERS:



The Meal Dryers are of the Rotary type with steam pipes running the full length. This dryer is intended for meals, small grains and similar materials that would scorch if permitted to lie on hot pipes.

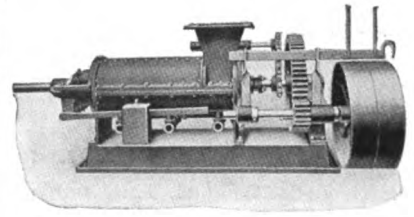
CONTINUOUS FILTERING MACHINES:



Continuous Filtering Machines are intended to extract the moisture from glucose, starch feeds, brewers' spent grains, distillers' slops and kindred materials which contain too much moisture to go direct into the dryer.

The principle is a perforated sectional metal belt passing between rolls. The material from which the excessive moisture is to be extracted is fed in here on the perforated belt and carried between the rolls. The machine is continuous in its operation.

THE EXPELLER:



This machine is for extracting the excessive moisture in many different materials and is intended to supply the demand where a cheaper filtering machine is wanted than the Continuous Filtering Machine. It is also continuous in its operation.

Digitized by Google

RUGGLES-COLES ENGINEERING CO.

120 BROADWAY, NEW YORK CITY

Ruggles-Coles Rotary and Paddle Dryers

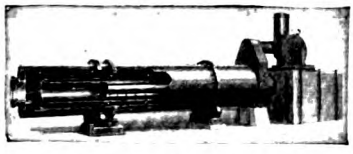
CLASS "A" DRYER:

Double Shell—Direct Heat

This is a patented double shell, direct heat dryer especially adapted for drying Coal; Coke; Ores; Rock; Stone; Sand; Concentrates, etc.

With this type of dryer, the maximum temperature to which the material can be heated is 400 degrees Fahrenheit, though the machine may beoperated so that the material will not be heated to over 220 degrees Fahrenheit.

Class "A" Dryer is built in seven standard sizes.



Class "A" Dryer—Showing Flow of Gases

Operation: The gases of combustion pass from the furnace through a brick-lined steel flue into the inner cylinder of the shell, and then pass back in the annular space between the two cylinders, coming into intimate contact with the material being dried. A steel plate exhauster is used to obtain this induced draught.



The comparatively high temperature of the gases entering the inner flue is quickly reduced by transfer of the heat from the gases to the drying material through the inner shell. When the gases leave the inner cylinder and turn back to the cascading material being dried, they are at a temperature of approximately 275 degrees Fahrenheit.

Passing out through the fan, the gases are approximately 150 degrees Fahrenheit. The rotation of the shell automatically showers the material through the gases and places it on top of the hot inner cylinder, and, as the discharge end of the shell is lower than the feed end, the material slowly works its way through the machine.

CLASS "B" DRYER:

Double Shell—Indirect Heat

This is a patented double shell, indirect heat dryer, especially adapted for drying China Clays; Talc Rock; Whiting; Kaolin; and those materials which can be dried at a fairly high temperature but must not come in contact with products of combustion due to possible injury or contamination.

Operation: Operation of this machine is similar to Class "A" dryer except that the gases of combustion after reaching rear end of the inner flue return in ducts or tubes attached to the inside of the outer shell and are then drawn out by the fan.



The material is fed into the space between the inner cylinder and the ducts. Due to the inclination and rotation of the shell, the material falls alternately onto the hot tube and ducts until it is delivered in a dried state through openings in the outer shell.

Our Class "B" Indirect Heat Dryer is built in three standard sizes.

CLASS "C" DRYER:
Rotary—Steam

There are many materials which cannot be dried by direct heat or even by indirect heat, due to high temperatures causing injury to the material. For materials of this nature, such as Brewer's Grains; Cotton Seed; Starch Feed; Tobacco Stems; Corn Germs, etc., we build and recommend a steam dryer.

This dryer consists of a rotary steel shell with a steam head at one end, threaded into which are steam pipes, running to the other end, with caps screwed on at that end. These steam pipes are set in rows as shown in the cross-sectional view.

The dryer is set on a slight inclination so that the water of condensation drains into the steam head as rapidly as formed and is blown out automatically six times to every revolution of the shell. A special rotary steam valve fits into the steam header at the end of the shell. The bases, bearings, steel tires and gears are of our standard heavy construction, so designed as to seldom cause any repairs or replacements.

Operation: The material is fed into the dryer by means of a feed spout in feed head. Inside the dryer the material is lifted and dropped by means of lifting flights back of the steam pipes, until the dried material is delivered through openings in the shell in front of the steam head. These openings are surrounded by a hood or rear head which delivers the dried material out at the bottom. A stack or fan is used to create sufficient draught through the revolving dryer shell to carry off the moisture.



CLASS "D" AND "E" DRYERS:

Paddle Type

These are distinct paddle dryers, built in special sizes for direct heat, indirect heat or steam—depending upon the material to be dried.

CLASS "F" DRYER:

Single Shell—Direct Heat



This is a single shell dryer of heavy and substantial design, with certain refinements that decrease the operating charges and increase the life of the machine.

Our Class "F" Dryer is built in five standard sizes; also special designs for unusual conditions.

GENERAL:

The complete line of Ruggles-Coles Dryers consists of eight distinct types for drying by means of direct heat, indirect heat and steam. We are prepared, however, to build special dryers for materials of unusual characteristics.



Digitized by Google

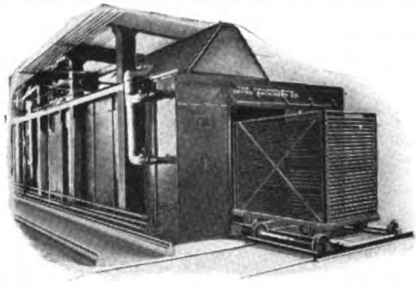
THE PHILADELPHIA DRYING MACHINERY CO.

PHILADELPHIA, PA.

MAIN OFFICE & WORKS
3351 Stokley St.

N. E. AGENCY
53 State Street
BOSTON, MASS.

Manufacturers of Drying and Dyeing Machinery



Tunnel Truck Dryer with Trays. Steel Construction. Asbestos Insulation.

"HURRICANE" DRYERS:

We specialize in Drying Machinery and have had many years' experience in developing "Hurricane" Dryers for various industries.

Our Engineering and Research Departments will gladly coöperate with you to determine whether the Truck, Tray, Tunnel or Automatic System is best and most economical for drying your particular product.

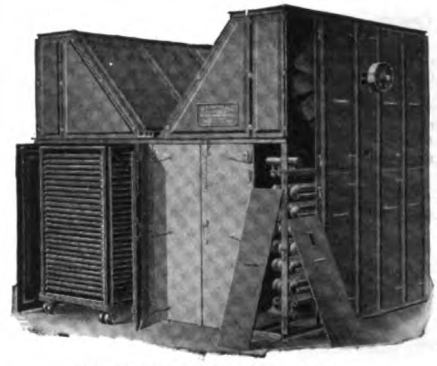
610

Some of the materials which are being dried:

Artificial Leather	Leather Board
Asbestos Board	Linters
Asbestos Pipe Covering	Lithopone
Binders Board	Nitrate of Soda Bags
Carpet	Paints
Chemicals	Pigments
China Ware	Plush
Clay Products	Porcelain
Cloth	Rags
Cocoanut	Reclaimed Rubber
Copra	Sanitary Porcelain
Cotton	Silk Piece Goods
Dyestuff	Spark Plugs
Electrical Porcelain	Straw Braid
Fire Brick	Sugar Bags
Flax	Terra Cotta
Fruit	Tobacco
Gas Masks	Toweling
Hair	Underwear
Hollow Tile	Vegetables
Hosiery	Wool
Leather	Yarn



Automatic Bag Dryer



Truck Dryer for Chemicals, Etc.

BLEACHING AND DYEING MACHINERY:

Complete Dyeing, Bleaching, Finishing and Drying Equipments for Hosiery, Toweling and Underwear.

Circulating Dyeing Machines for all kinds of Skein Yarn, Braid, Tape and Raw Stock.

PRESSES:

Hydraulic and screw presses for all purposes.

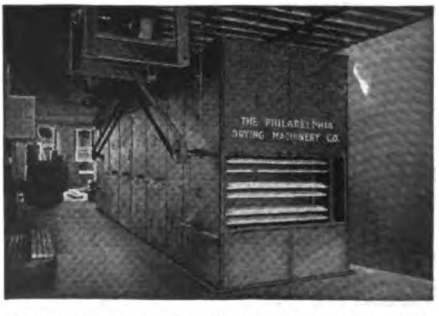
"HURRICANE" FANS:

Belt and motor driven.

"Hurricane" Machinery saves time, labor, steam, floor space.

Complete information and descriptive catalogs sent upon request.

SEE OUR ADVTS. IN MECHANICAL ENGINEERING THE JOURNAL OF THE A.S.M.E.



Automatic Dryer for Spark Plugs, Electrical Porcelain, Etc.

Digitized by Google

SWENSON EVAPORATOR COMPANY

945 MONADNOCK BLDG., CHICAGO

Engineers and Manufacturers of Special Machinery

PRODUCTS:

Evaporators:

Single and multiple effects
Standard Swenson Horizontal Tube type
Patented Seco Basket type
Patented Semi-film type "K" machine
High Concentrating type
Standard Vertical Tube Center Downtake type

Pulp Mill Machinery:

Evaporators
Leaching Batteries
Incinerators
Disc Evaporators
Melt Tanks and Agitators
Caustic Tanks and Agitators

Sugar Mill Machinery:

Evaporators
Vacuum Pans
Diffusion Batteries
Pre-evaporators
Juice Boilers
Juice Heaters
Beet Pulp Presses
Beet Wheels
Beet Washers
Sulphur Stoves

Special Chemical and Waste Product Machinery:

When any of our regular types of evaporators or machines do not satisfactorily meet all conditions, we design special types or combinations of types to produce the desired results.

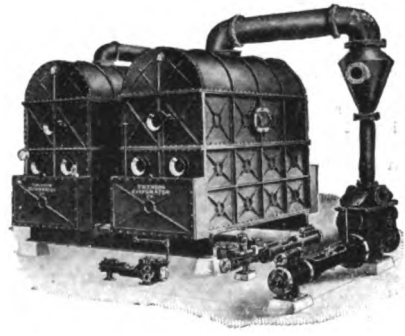
A FACTORY SCALE EXPERIMENTAL LABORATORY EVAPORATOR IS AVAILABLE FOR ALL PURPOSES.

MATERIAL HANDLED:

Any liquor concentrated in commercial quantities. The following partial list is indicative of the unusually wide range of our work:

Ammonium Chloride
Beef Extract
Bittern
Black Liquor
Calcium Acetate
Calcium Chloride
Caustic Soda
Distilled Water for Power Plants and Ice Plants
Fish Water
Fruit Juices
Garbage Water
Gelatine
Glucose
Glue
Glycerine
Iron Sulphate
Magnesium Chloride
Malt Extract
Mercerizing Waste
Milk Whey
Molasses Waste
Pepsin
Potash
Potassium Sulphate
Salt
Sodium Benzo-Sulphanate
Sodium Carbonate
Sodium Nitrate
Sodium Sulphate
Sorghum Syrup
Steep Water
Steffens Water
Sugar
Sulphite Waste
Tank Water
Tannin Extract
Tartaric Acid
Tobacco Extract
Tomato Pulp
Twitchell Water
Western Lake Waters
Wool Scourings
Zinc Chloride

611



CATALOG:

Our catalog explains the economy of multiple effect evaporation, and the construction of the various types of evaporators, illustrated with blue prints as well as photographs. We have included tables giving:

Steam and Water Consumption for various capacities of single and multiple effect evaporators; Relation of evaporators to boilers and engines; Properties of saturated steam; Steam consumption of engines, turbines and pumps; Comparison of specific gravity and various hydrometer scales; and other useful information.

Also list of customers and data required for quotations.

Digitized by Google

STEACY-SCHMIDT MANUFACTURING COMPANY

YORK, PENNSYLVANIA

Manufacturers of Lime Kilns and Complete Hydrating Plants

PRODUCTS:

KEYSTONE LIME KILNS
Complete Lime and Hydrating Plants, Belgian and other type kilns for extraction of Carbon Dioxide Gas.
Equipment for Eldred Process of Burning.

Also:
Turntables
Sugar Machinery
Char Kilns
Dryers
Evaporators
Bag Filters
Crystallizers
Stacks
Tanks
Castings
Special Equipment from Engineer's designs.

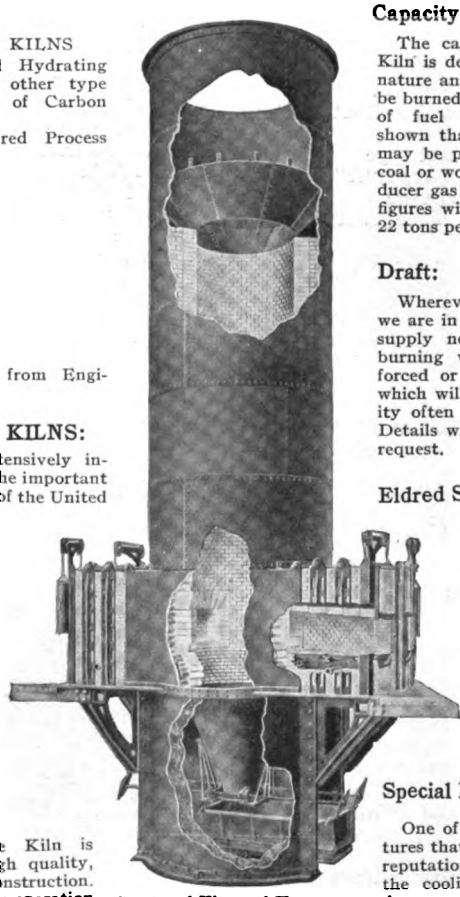
KEYSTONE LIME KILNS:

These kilns are extensively installed throughout all the important lime producing centres of the United States, Canada, Mexico, Peru, Chili, Cuba, Porto Rico, and South America, where they are satisfactorily meeting the demands of operators. Use of these kilns guarantees uniform calcination, lowest operation and maintenance costs and a well-sustained tonnage.

612

Construction:

The extraordinary strength and durability of the Kestone Kiln is explained by the high quality, all-steel, brick-line construction. This insures continuous operation and absolute dependability from breakdown. Cross section view of the kiln illustrates all the important features of construction and design.



Sectional View of Keystone Lime Kiln

Capacity:

The capacity of the standard Kiln is dependent both upon the nature and quality of the rock to be burned and the kind and grade of fuel used. Experience has shown that 8 to 10 tons of lime may be produced per day, using coal or wood as fuel. Where producer gas or oil is employed these figures will be increased to 18 to 22 tons per day.

Draft:

Wherever desired and specified, we are in an excellent position to supply necessary equipment for burning with the aid of either forced or induced draft,—use of which will mean increased capacity often as high as 15 to 20%. Details will be gladly given upon request.

Eldred System:

Keystone Kilns can be made adaptable for burning by means of the Eldred Process using gas, wood, coal or oil as fuel. We will be glad to give details regarding this patented system of burning lime which has brought increased production and decided economies for many lime operators.

Special Feature:

One of the many exclusive features that has brought an envious reputation to Keystone Kilns is the cooling cone with patented draw gates. This allows for drawing of the lime and loading direct into a box car, eliminating the extra handling caused by having the lime discharged upon the floor until cold.

Fuel:

Keystone kilns are designed to efficiently burn either coal, wood, gas or oil as fuel. The simplicity of the kiln permits easy and inexpensive transfer from one fuel burning system to another should original operating conditions change and require such action.

Specifications:

Outside diameter of kiln	11 ft.
Height of kiln	48 ft.
Diameter of kiln inside brick lining	6 ft. 6 inches

Engineering Service:

Our Engineering Department is, at all times, ready to furnish complete information regarding Keystone Standard Lime Kilns or other equipment manufactured by this company.

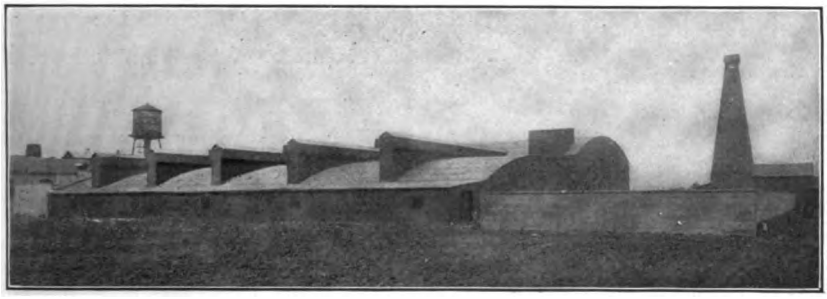
This department is composed of men thoroughly experienced in lime burning machinery and is well prepared to aid in the solution of difficult problems and to furnish complete lime and hydrating plants, either from our own specifications and designs or those submitted by the client.

Digitized by Google

WILLCOX ENGINEERING CO.

SAGINAW, MICHIGAN

Manufacturers of Crystallizing Plants and Equipment



PRODUCTS:

Willcox Crystallizers and Grainers for salt, potash, saltpeter, and sodium nitrate.

Willcox Rakers for automatically and continuously delivering from the crystallizers as fast as the product is formed.

Willcox Automatic Conveyors for handling and distributing the crystalline material to a refinery mill or warehouse.

Willcox Bucket Elevators for handling salt, potash, or other crystalline material.

Willcox Liquid Weighing and Measuring Machine for automatically weighing and measuring water, caustic liquor, brine, etc.

SALT PLANTS:

The salt plant illustrated, designed and equipped by Willcox Engineering Co., is almost automatic.

There are only two men on its payroll, one day-man and one night-man.

The plant has been in continuous operation for more than six years, producing about two hundred sixty barrels of salt per 24 hours from rather dilute brine obtained by pumping from a well 800 ft. deep.

This salt plant operates by exhaust steam from an adjoining manufacturing plant, the salt constituting a by-product of the exhaust steam.

The one-man crew carries out the following operations of the entire plant:

Pumps the brine.

Treats it with lime.

Settles the brine for 48 hours.

Preheats it.

Evaporates it in three grainers or vats, 150 ft. long by 12 ft. wide, equipped with Willcox patent submerged salt rakers which, with the system of automatic conveyors, delivers the salt commercially dry into the storage warehouse.

Draws the residual liquor from the grainers into a fourth grainer and further concentrates it, producing ice cream salt and a concentrated mother liquor which is pumped to tank cars and sold to a chemical plant for the production of bromine and calcium-magnesium chloride.

All of the foregoing operations are carried out as before stated by a one-man crew.

The item of renewals and repairs and depreciation during five years of operation has been insignificant because of the durability and simplicity of design of the apparatus employed.

The above plant is typical of many such designs and installations that have been made by the Willcox Engineering Co. during nearly twenty years of practical experience in the design and operation of plants for the manufacture of salt and many other crystalline materials.

WILLCOX AUTOMATIC LIQUID WEIGHER:

This machine automatically weighs and records brine, caustic liquors, water of condensation from evaporators, boiler feed water.

It is a necessity in plants where a record of liquid measurements is desirable.

ENGINEERING SERVICE:

Plans and specifications prepared for complete evaporating and crystallizing plants for the treatment of brine and its by-products, and consulting service in connection with the preliminary development of proposed plants of this character, constitute a valuable help to the clients of the Willcox Engineering Co.

(See page 272 for additional products of this Company)

Digitized by Google

Lathes, Centrifugals, Oil Separators, Fabric Coating Machines

AMERICAN TOOL & MACHINE CO.

TRADE MARK REGISTERED U. S. PATENT OFFICE

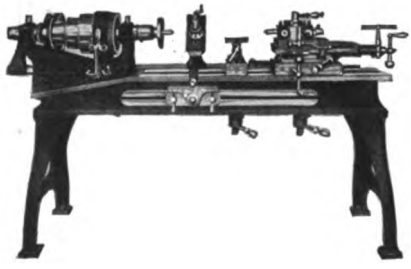
Established 1843

BOSTON 9

FOX BRASS FINISHERS' LATHES:

Patented and introduced in 1857.

14 styles and sizes.



A constantly increasing demand for more than sixty years.

BELT KNIFE LEATHER SPLITTING MACHINE:

Used all over the world.

Splitting is the most profitable process in leather manufacture.

FABRIC COATING MACHINES:

For artificial leather, waterproofing.

Spreaders—Doublers

RUBBER CEMENT CHURNS:

POWER TRANSMISSION MACHINERY:

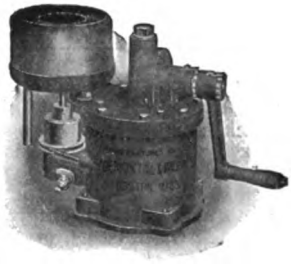
"AMERICAN," "BOSTON" and "GIANT" Hangers, superior in design, construction and operation.

Friction clutches and all specialties.

WESTON CENTRIFUGALS:

Patented, developed and introduced in 1866.

First developed for sugar and modified to meet every demand requiring centrifugal process.



5 Inch Hand Power

10 inch belt or motor for laboratory.

30–36–40 inch for chemicals, drugs, nitrating, salt, sugar and everywhere centrifugal process is required.

20 inch with removable basket for drying small pieces that have been coated, dipped, japanned, painted, plated or washed.

20 inch to 54 inch hydro extractors for cotton, wool, silk, raw stock, yarns, fabrics, underwear.

Various sizes for special products; bottom driven, top driven.

ROPER CENTRIFUGAL OIL SEPARATOR:

For saving oil from chips and turnings.

Built for more than forty years with a larger demand than ever.

Engineers—Founders—Machinists

Digitized by Google

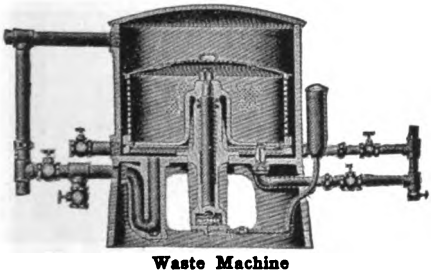
THE OIL AND WASTE SAVING MACHINE COMPANY

1509 REAL ESTATE TRUST BLDG., PHILADELPHIA

Manufacturers of Machinery for Separating and Reclaiming Oil and Waste, Centrifugal Oil Filters, Oil Extractors for Cleaning Oily Chips

IMPROVED WASTE MACHINE:

The basket or waste receptacle in the machine is driven by direct connected steam turbine, which exhausts into the basket, heating and liquefying the oil and grease, which is extracted from the waste, towels or rags by centrifugal force. The machine is then filled with water, and the waste, towels or rags thoroughly washed and sterilized, after which same is dried by the machine for future use.



Waste Machine

Guaranteed saving of 90% of the oil and all of the waste. Requires little attention. Over 3,000 machines in use. Made in 10″, 15″, 20″ and 36″ sizes with respective capacities of ½ cu. ft., 1 cu. ft., 2 cu. ft., and 8 cu. ft. of waste rags or machinery towels per charge.

TURBINE CENTRIFUGAL SEPARATOR:



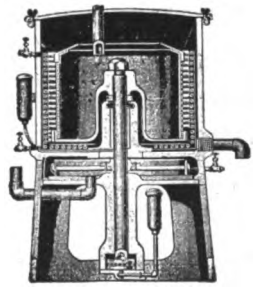
Turbine Centrifugal Separator

For Extracting Oil from Metal Turnings. This machine is steam turbine driven and the heat from the steam coming into contact with the oily chips and turnings aids the centrifugal action in producing an absolute oil extraction not procured with ordinary belt driven Separators. Machine can be operated with air. All belting and countershafting troubles and cares are entirely eliminated.

The basket capacity of this Machine is 8 cu. ft., making it especially adaptable for the handling of long, curly and bushy turnings.

TURBINE CENTRIFUGAL OIL FILTER:

Will remove all foreign matter, all moisture or emulsion from and sterilize the oil. Driven by direct connected steam turbine. The filter requires very little steam to operate same, owing to its design and its being equipped with a ball step-bearing; requires little care in operation and has practically no wearing parts.



Centrifugal Oil Filter

SPECIFICATIONS

Size	15″	20″
Base measurements..	21″x21″	27″x27″
Height.....	30″	40″
Weight.....	450 lbs.	800 lbs.
Steam pressure required to operate..	20 lbs.	40 lbs
Steam consumed per hour of operation..	83 lbs.	138 lbs.
Oil filtering capacity per hour.....	20 to 30 gals.	50 to 60 gals.

Digitized by Google

TOLHURST MACHINE WORKS

TROY, N. Y.

Manufacturers of Centrifugals

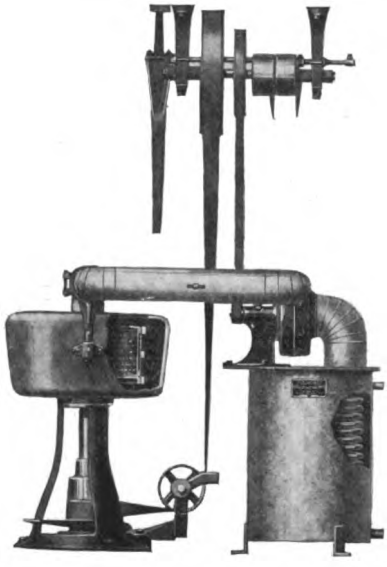
NEW YORK OFFICE: 111 Broadway

SOUTHERN REP.: Fred. H. White, Realty Bldg., CHARLOTTE, N. C.

WESTERN REP.: John S. Gage, Hartford Bldg., CHICAGO, ILL.

SAN FRANCISCO REP.: B. M. Pilhashy, 532 Merchants Exchg. Bldg., SAN FRANCISCO, CAL.

CANADIAN REP.: W. J. Westaway Co., Main and McNab Sts., HAMILTON, ONT.; 400 McGill Bldg., MONTREAL



TOLHURST CENTRIFUGAL METAL DRYING PROCESS:

For drying small metal articles, pearl buttons, etc., in a centrifugal.

Used in place of the sawdust tumbling barrel.

Its advantages are rapidity of operation, elimination of sawdust from the plant and a beautiful and uniform finish.

Products ranging in size from small watch parts to cabinet hardware are being successfully handled.

In use by nearly all of the largest manufacturers of small metal parts.

SEE OUR ADVTS. IN MECHANICAL ENGINEERING THE JOURNAL OF THE A.S.M.E.



TOLHURST CENTER-SLUNG CHIP WRINGER:

For extracting and reclaiming oils and cutting lubricants from metal turnings, chips, etc.

Baskets 40 and 48 inches diameter.

Capacities 8.7 and 12.5 cu. ft.

Intended for economical handling of large quantities.

Inner removable basket arranged for rapid loading and quick dumping.

Also Centrifugals and Hydro-Extractors of all types for Textile and Chemical Plants.

Write for catalogues and detailed information.

Digitized by Google

ATMOSPHERIC CONDITIONING CORPORATION

435 CHESTNUT ST., PHILADELPHIA

Canadian Representatives
DARLING BROTHERS, LTD.
120 Prince Street
MONTREAL

European Representatives
ATMOSPHERIC STEAM HEATING CO., LTD
22 Broadway, Westminster, S. W.
LONDON, ENGLAND

Representatives in the principal cities of the United States

MANUFACTURERS OF EQUIPMENT FOR MAINTAINING ARTIFICIAL ATMOSPHERIC CONDITIONS IN INDUSTRIAL PLANTS:

The addition of the proper percentage of humidity to make up deficiency.

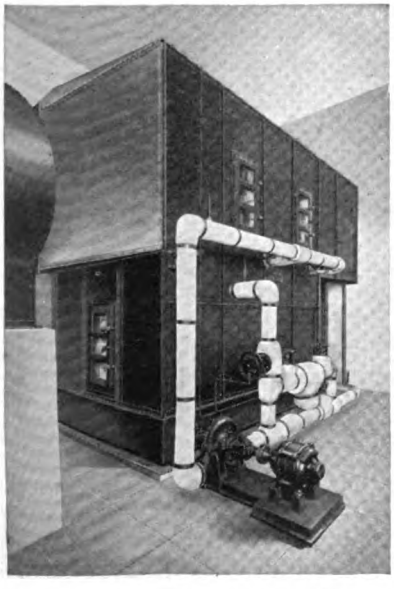
The removal of excessive humidity when high moisture content in the air prevents proper drying or carrying out of certain processes.

Maintaining either high or low temperatures where local conditions or specific materials demand such treatment.

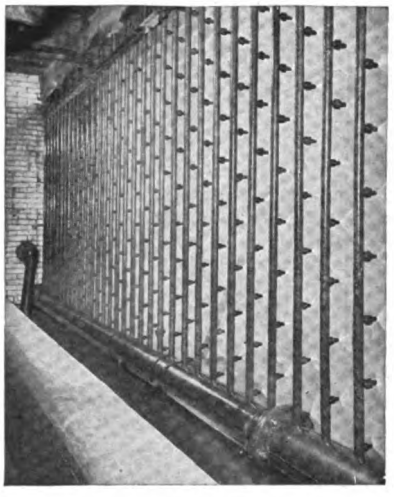
The maintenance of uniform humidity conditions within 2% of that for which it is set.

The maintenance of working spaces at the Comfort Zone to insure efficiency of employees.

The cleansing and cooling of air for the Ventilation of Turbo Alternators, equipment commonly known as GENERATOR COOLERS.



Atmospheric Dehumidifier Installed in Large Industrial Plant Manufacturing Food Products



View of Spray Chamber Showing Operation of Nozzles in Atmospheric Equipment

617

WEBSTER AIR WASHERS:

TYPE "A" APPARATUS, designed primarily for air washing in connection with ventilating systems in public buildings, where a moderate cooling effect by evaporation is desired.

TYPE "B" APPARATUS, designed for air washing in public buildings and industrial plants, where the greatest possible cooling effect by evaporation is desired.

WEBSTER SYSTEM OF HUMIDITY CONTROL may be applied to the various types of Webster Air Washers, Humidifiers and Dehumidifiers. Perfect in principle and accurate in operation—the chief controlling thermostat subject to water, a medium with four times the specific heat of air.

AIR CONDITIONING TRADE MARK

Consult us regarding air conditioning apparatus for any purpose.

Send for Bulletins as they are produced.

Digitized by Google

DRYING SYSTEMS, INC.

11 S. DESPLAINES ST., CHICAGO, ILL.

Contracting Engineers

Designers and Builders of Drying and Air Conditioning Equipment

SERVICES:

Designing, building, and installing of apparatus for the conditioning, aging, or drying of all commodities that may be so treated, in entire buildings, floors or rooms, compartments or cabinets, dry kilns or tunnels by the application of currents of air which are controllable as regards volume, heat, and moisture content.

Among the materials which may be treated in this manner are the following:

Biological Products
Chemicals
Dimensioned Stock (Lumber)
Dry Colors
Dye Stuffs
Fruits and Vegetables
Glued-up Stock (Veneered panels)
Herbs
618 Leather
Pharmaceutical Products
Soap
Siccative Coatings, such as:

Enamel	Primer
Filler	Shellac
Lacquer	Stain
Paint	Varnish

Applied to Wood, Metal, Leather and Fabric for the following industries:

Automobile (bodies, chassis, wheels)
Furniture
Office Equipment (wood, metal)
Pianos
Talking Machines
Trucks
Tractors
Agricultural Implements
Aeroplanes

Having made a large number of installations for most of the above materials, tentative estimates can be furnished without further investigation. Tests in our laboratory on customer's samples obtain the necessary data for estimating the cost of equipment for the drying of any materials for which such data have not been previously established. These tests are made free of charge.

PRODUCTS:

(*a*) **The Greeff System of Drying and Conditioning** comprising the Greeff Static Air Washer-Humidifier, eliminators, heating coils, automatic temperature and humidity controls and fan. This equipment is placed in more or less close proximity to the room, or series of rooms, to which the conditioned air is led by means of ducts. Properly spaced air supply nozzles and vent ducts insure a thorough circulating of air within the rooms and an adjustable recirculating system effects a large saving in operating expense. While this system is largely used by manufacturers of automobiles, pianos, talking machines and furniture, it is applicable to many other commodities, and may be installed in connection with rooms, kilns or tunnels, for continuous or periodical loading.



Greeff Equipped Finishing Room

(*b*) **The Drying Unit** is a factory assembled drying equipment consisting of fan, air-washer, humidifier, radiators (for either high or low pressure steam), humidity and temperature controls, all under one substantially constructed sheet metal casing. This Unit will handle dryrooms for most of the materials listed above up to 800 square feet of floor space. For small dryrooms this has proven to be the logical equipment as initial and operating costs are extremely low.

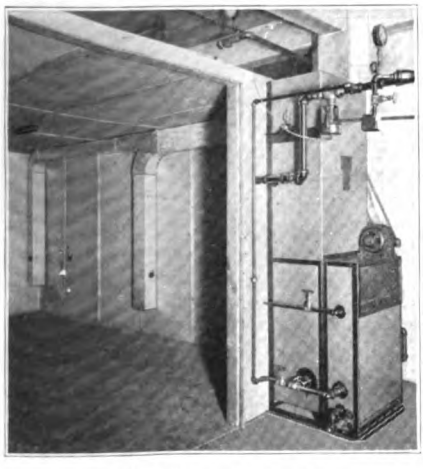
(*c*) We have an exclusive license for the United States to use the Carrier **Ejector System** for increasing air circulation within the dryroom for varnishes, undercoatings, dimensioned and glued-up stock, etc.

Digitized by Google

DRYING SYSTEMS, INC. CHICAGO, ILL.

(*d*) **The Spray System of Drying** consists of a hot chamber into which the liquid is introduced in the form of a fine mist by means of steam or air operated sprays. All the dried product is immediately eliminated from the hot chamber and complete recovery of solids is procured at one point. Soluble and miscible properties of milk all retained. Equipment especially adaptable for milk, chemicals, liquids, eggs, etc.

(*e*) **The Compartment Type "W"** for fast drying of materials placed on trays. Each compartment, holding one rack or truck, is equipped with oscillating dampers which cause a uniform drying in every portion of the rack. The air is washed, if necessary, passed through stacks of heaters, and by means of a fan, forced through each compartment independently. Air is largely recirculated



Drying Unit and Dryroom

to utilize the beneficial effect of moisture and to reduce operating expense. This system is suitable for medium sized production.

(*f*) **The Tunnel Type "G"** for economic drying of materials placed on interlocking trays which are stacked to form a rack. The unloading of the rack contents is accomplished by means of a dumping device. The air is washed, if necessary, then by means of a fan, forced through heater stacks into and through the tunnels. Temperature is automatically controlled; likewise the humidity whenever required. This system is suited to quantity production and is continuous.

(*g*) **The Merrill Process of Fluid Heat Transmission** furnished us by the Parks-Cramer Company, whenever any of the aforementioned systems are installed for working temperatures above 225° F.

(*h*) Trays, Racks and Trucks.

(*i*) Conveyors of every type.

(*j*) Housing and doors for compartments, dryrooms, kilns, and tunnels; or blue prints and specifications for same in the event that customer prefers to build his own.

Whenever any of the foregoing systems are installed for the purpose of drying varnish, paint and similar finishing material, the user is afforded the protection of a license under U. S. Patent No. 1,186,477 issued to Dr. Wm. M. Grosvenor. This covers a process of drying and hardening siccative coatings by heat in the presence of added moisture, which is the only practical method to prevent premature surface hardening. Its application results in the production of a superior finish, a considerable saving in time and corresponding saving in space and working capital. It enables the user to establish a definite finishing schedule independent of weather conditions, an accomplishment unattainable before the introduction of this process. Our system has also found favor with manufacturers in its application to the conditioning of the rooms in which these siccative coatings are being applied, and for the final curing of the rubbing varnish and the flow coat. The results of each of these installations were a marked improvement in the efficiency of the working force as well as the appearance of the finished surfaces.

Inquiries solicited:

When sending your inquiry give us all data upon which to base our estimate.

1. Description of material (sample if possible)
2. Output per hour in dry weight
3. Specific weight (and heat, if known)
4. Moisture content in wet material
5. Moisture content in dry material
6. Form in which material will reach dryer (filter cake, bulk, etc.)
7. Maximum temperature to which material may be subjected in drying
8. State drying method now used, nature of production, kind of equipment preferred.

Descriptive bulletins sent on request.

Digitized by Google

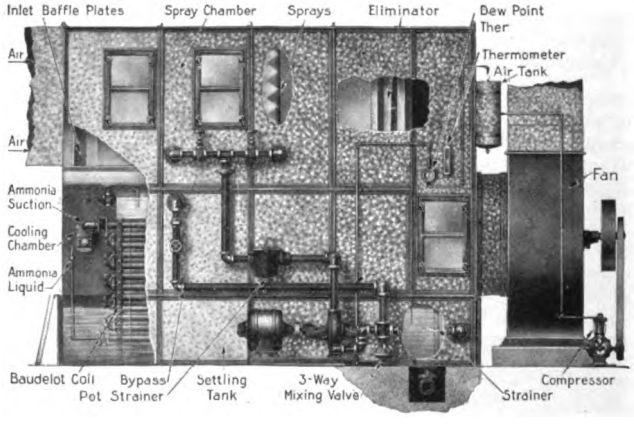
CARRIER ENGINEERING CORP'N

39 CORTLANDT ST., NEW YORK

Consulting, Designing and Contracting Engineers
Specialists in Air Conditioning and Drying

BRANCH OFFICES

BUFFALO, Prudential Bldg.
BOSTON, 176 Federal Street
PHILADELPHIA, Land Title Building
CHICAGO, Transportation Building



Illustrating a Typical Carrier Installation

620

SERVICES AND PRODUCTS:

Carrier AIR CONDITIONING AND DRYING EQUIPMENT

TRADE MARK

Consultation, Designs, Construction, Equipment and Installation, complete or in part, of plants for the purpose of Humidifying, Dehumidifying, Cooling, Air Washing, Automatic Temperature and Humidity Regulation, and Drying.

EXPERIENCE AND CO-OPERATIVE SERVICE:

Our claim to consideration is based upon extensive research and experimentation by America's pioneer engineers in these lines, upon long experience in design and installation, upon enviable records by hundreds of prominent installations made under our direction, and last, but not least, upon our eagerness to keep every client permanently pleased.

By securing our co-operation with engineers or architects on difficult air conditioning work, time and money are saved and protection furnished against faulty or unsuitable selection, and proportion of parts.

A conference between your engineers and ours may show big differences between what is now contemplated and what you should have.

The Carrier System has the Flexibility to Meet Every Commercial Requirement in Air Conditioning.

Humidifying or dehumidifying alone.

Humidifying or dehumidifying with heating.

Humidifying or dehumidifying with cooling.

Humidifying with cooling in summer and heating in winter.

Humidifying with heating in winter and dehumidifying with cooling in summer.

Maintenance of uniform temperature or humidity or both.

Maintenance of uniform relative humidity.

Thorough Ventilation and Air Washing in All Instances.

The performance of every Carrier installation is guaranteed upon unmistakable terms, and if you will tell us about your air conditioning problems we will send instructive literature and give you some valuable suggestions.

Exclusive rights to the Carrier methods of humidity control.

SEE OUR ADVT. IN MECHANICAL ENGINEERING

Digitized by Google

SKINNER BROS. MFG. CO., INC.

1400 TO 1490 VANDEVANTER AVE., ST. LOUIS, MO.

Manufacturers of Skinner Bros. (Baetz Patent) Air Heater Systems, Drying Systems for All Purposes

SKINNER BROS. (Baetz Patent) AIR-HEATING APPARATUS:

The Skinner Bros. (Baetz Patent) Air Heating System is in successful operation in many of the largest foundries and industrial plants in the United States and it has been demonstrated time and again



Skeleton View of Skinner Bros. (Baetz Patent) Heater

to be the ideal system for the heating of large exposed buildings.

We are willing at any time to back our judgment by placing Skinner Bros. (Baetz Patent) Air Heating Systems on trial for heating, drying or removal of steam, in any plant no matter how exposed it may be and we will guarantee satisfactory results or remove the system without cost.

Construction of the Baetz Heater:

The Skinner Bros. (Baetz Patent) Air Heater is constructed of heavy steel plates and angles. The upper part is occupied by coils of steam pipe. The blower or fan is placed beneath them in the same enclosure.

The air is drawn in by the fan from two sides and is forced upward against the steam-heated coils, and passes out at top as heated air. The fan does not handle heated air, but takes cold air as it passes directly into blower.

The Warming System:

The Skinner Bros. (Baetz Patent) system of factory warming provides an even distribution of warmth throughout even the largest buildings, without use of distributing pipes.

This result is possible of accomplishment only because the Skinner Bros. (Baetz Patent) Air Heater draws cool air in at the bottom and discharges it vertically through the heating coils. This causes a steady, though unnoticeable, movement of all air within the room, the heated air constantly moving away from heater and towards the walls, where lt becomes cooler and falls, then is drawn back and into the blower to be heated again.

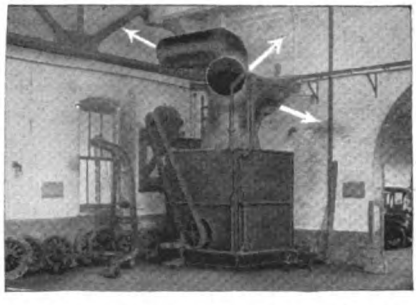
Various Uses of the Skinner Bros. (Baetz Patent) Heating System:

Some of the large packing houses and paper mills which are troubled with steam or vapor have them installed for the purr pose of removing this difficulty. For drying purposes they are used in fire brick works, candy manufacturing concerns, shoe manufacturing concerns and others whose business requires a drying system.

Special Features:

Live steam direct from boiler, or exhaust steam may be used.

Heater is shipped set up, ready for steam connection.



Installation of Anheuser-Busch, St. Louis, Shows Three Outlets Supplied from One Heater

Floor space occupied is less than one-third of what any other system requires.

Low cost of maintenance and uniform heat distributed.

Units can be removed from place to place, as there are practically no pipes or distributing ducts used with our installation.

Digitized by Google

KEWANEE BOILER COMPANY

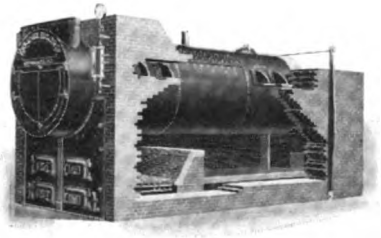
KEWANEE, ILLINOIS

BRANCH OFFICES:

ATLANTA, Ga.: H. E. Hague, 1524–1525 Candler Bldg.
BUTTE, MONTANA: C. H. Cobb, Daly Bank Building
CHICAGO, ILLINOIS: Kewanee Boiler Co., Washington & Market Sts.
CINCINNATI, O.: Wm. Grier, P. O. Box 75, Savoy Hotel
CLEVELAND, O.: Colby-Merrill Co., 706 Rose Building
COLUMBUS, O.: Colby-Merrill Co., 808 First National Bank Bldg.
DALLAS, TEXAS: J. H. Van Zandt, 804 Southwestern Life Bldg.
DES MOINES, IOWA: Kewanee Boiler Co., 315 Hubbell Building
DETROIT, MICH.: Coon-DeVisser Co., 1772 LaFayette Blvd.
GRAND RAPIDS, MICH.: R. W. Houser, 611 Ethel Ave. S. E.
INDIANAPOLIS, IND.: Kewanee Boiler Co., 509–510 Occidental Bldg.
KANSAS CITY, MO.: Kewanee Boiler Co., 2014 Wyandotte St.
LOS ANGELES, CALIF.: Geo. B. Larimer, 703 Baker-Detwiller Bldg.
MILWAUKEE, WIS.: Kewanee Boiler Company, 835 Merchants & Mfg. Bldg.
MINNEAPOLIS, MINN.: Kewanee Boiler Company, 708 Builders Exchange Bldg.
NEW YORK, N. Y.: Kewanee Boiler Co., 47 West 42nd St.
PEORIA, ILL.: F. D. Pfeiffer, 209 N. Underhill St.
PITTSBURGH, PA.: F. L. Bunton, 945 Oliver Building
SAN ANTONIO, TEXAS: H. J. Dalton, LeBarre Hotel, 230 Ave "E"
SAN FRANCISCO, CALIF.: Kewanee Boiler Co., 72 Fremont St.
SALT LAKE CITY, UTAH: T. A. Williams, Scott Building
ST. LOUIS, MO.: Kewanee Boiler Co., 1212 Chemical Bldg.
TOLEDO, O.: Colby-Merrill Co., 1121 Nicholas Bldg.
TULSA, OKLA.: W. E. Thacher, Oxford Hotel
SEATTLE, WASH.: C. H. Blackwell, Central Building
PHILADELPHIA, PA.: Kewanee Boiler Co., Real Estate Trust Bldg.
SPOKANE, WASH.: John H. Griffith, 244 Sprague Ave.

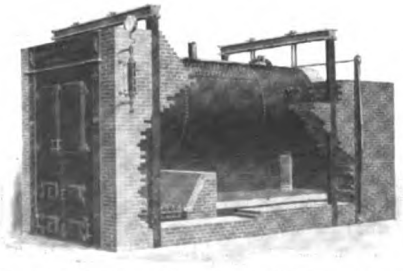
Manufacturers of Power Boilers, Horizontal Tubular Boilers, Smokeless Boilers, Grates, Heating Boilers, Breechings, Water Heaters, Tanks and Radiators

KEWANEE POWER BOILERS:

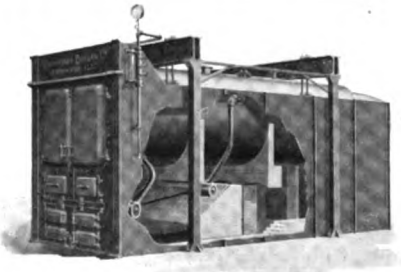


Kewanee Horizontal Tubular Boiler with Full Front Setting—Supported on Walls

Kewanee boilers are built in accordance with the A.S.M.E. Boiler Code. In working to this universally known standard and with our thirty five years of experience we offer a product which is dependable, safe and of known reliable performance.



Kewanee Horizontal Tubular Boiler Suspended Independent of Masonry



Kewanee Smokeless Tubular Boiler with Downdraft Furnace and Steel Casing

In every detail of construction there is concrete evidence of superior material and workmanship. The strength and quality of all raw materials are thoroughly tested to conform to rigid specifications; and this same policy is followed in the forming of the various parts.

Our entire mechanical force, including operators, foremen and engineering staff are experienced, earnest men thoroughly enthused in the building of boilers. These are the ethics that govern the production of Kewanee boilers—more than mere horizontal tubular boilers.

Digitized by Google

KEWANEE BOILER COMPANY — KEWANEE, ILL.

Our boilers are carried in stock to carry either 125 or 150 lb. working pressure and at rated horsepowers of 80, 90, 100, 110, 125, 150, 165, 180 and 200.

Complete description in our Catalogue No. 73.

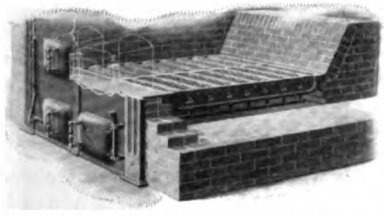
KEWANEE SMOKELESS BOILERS:

Designed for high continuous overloads with bituminous fuel, yet with an economical consumption of fuel. Liberal design of grate makes less frequent cleaning necessary during the overload periods. High steaming capacity obtainable by our forced circulation principle. Steel cased to prevent air leakage. Large combustion chamber to insure complete fuel consumption.

Stocked in sizes of 115, 130, 145, 160, 180, 200, 225, 250 and 275 H.P. for 125 and 150 lbs. working pressure.

Send for Catalogue No. 73.

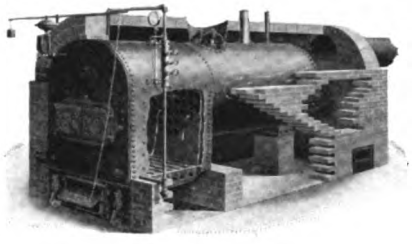
CENTURY ROCKING GRATES:



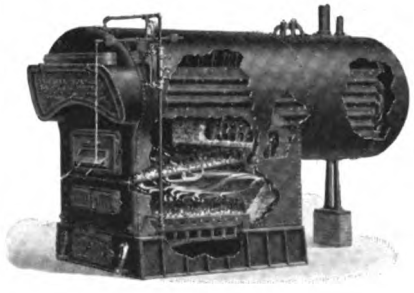
The increased boiler efficiency and saving in fuel costs are two indisputable reasons why Century Rocking Grates are cheaper than stationary grates. Their strong and durable construction insures long life. Made in two styles, 5/8 inch air space and 3/8 inch air space. Can be attached to any style of setting by your operating engineer without changing brick work.

We can also furnish the common grate, the Sheffield or Tupper Grate and a Sawdust Grate, as well as a combination Rocking and Dumping Grate especially adapted for use with anthracite coal.

KEWANEE HEATING BOILERS:



Built of steel and in full accord with the A.S.M.E. Boiler Code. Built in the straight draft type and the smokeless type. Honestly rated to heat all the radiation shown by their capacities. Made for 2600 to 16,000 sq. ft. capacity



with steam and 4300 to 26,400 sq. ft. capacity with water in the smokeless brick set type; and from 900 to 14,000 sq. ft. with steam and 1500 to 23,100 sq. ft. with water in the straight draft type, brick set.

More than 500 U. S. post office buildings are heated with Kewanee boilers.

Catalogue No. 76 explains in detail.

(See page following)

Digitized by Google

(Continued from preceding pages)

KEWANEE BOILER COMPANY — KEWANEE, ILL.

KEWANEE WATER HEATERS:



Tabasco Type—Built of steel to withstand the water pressure of any city in the United States. Made in sizes to heat from 130 to 700 gallons of water per hour. Furnished with tank and magazine feed if desired.



Garbage Burner Type—For such institutions as hospitals clubs, sanitariums, hotels considerable saving can be made in the use of this type of water heater. It saves fuel cost and disposal costs. Made to withstand 125 lbs. pressure so as to safely carry any city main pressure. Will heat 200 to 1800 gallons per hour, 50 degrees.

TANKS:

Standard Tanks for water working-pressure up to 65 lb. Made in capacities of 66 to 1000 gallons with and without coils.

Extra heavy tanks for water working-pressure up to 100 lb. Capacities range from 120 to 1700 gallons.

Pressure and Storage Tanks carried in stock from 750 to 13,500 gallons at 100 lb. pressure and made to your specifications.

Pneumatic Tanks built for 75 lb. water working-pressure and carried in stock in sizes from 24″ x 5′ – 0″ to 48″ x 24′–0″.

Air receivers stocked to carry 110 lb. working-pressure with capacities from 11 to 223 cu. ft. Fittings include pressure gauge, pop safety valve and blow-off cock.

See our Catalogue No. 75.

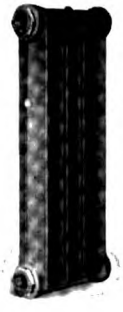
RADIATORS:



For Steam or Water.

Made in the single, two, three and four column and window types with from 1 to 32 sections per unit.

	Square Feet of Heating Surface per Section					
	18 in. High	22 in. High	26 in. High	32 in. High	38 in. High	45 in. High
Single Column				2⅓	3	
Two Column			2⅔	3⅓	4	5
Three Column		3	3¾	4½	5	6
Four Column	3	4	5	6½	8	10



Direct-Indirect Radiators with box base to fit three column steam or water radiators of from 3 to 12 sections.

Wall radiators are made in units leaving 4, 5 and 6 sq. ft.

Send for our catalogue No. 72.

ENGINEERING SERVICE:

So that our products may be made to render the most efficient service you are invited to avail yourself of the advice and counsel of our engineering staff. In making use of this service you will never find cause for regret in any investment in Kewanee products.

Digitized by Google

L. J. WING MFG. CO.

354–366 WEST 13TH STREET, NEW YORK

WORKS: NEWARK, N. J.

Manufacturers of Fans, Blowers, Turbines, Regulators, Unit Heaters

BRANCH OFFICES: ALL PRINCIPAL CITIES

"WING-SCRUPLEX" EXHAUSTER:

The Wing-Scruplex Exhauster combines the installational advantages of the encased or centrifugal type of fan with the high efficiency, simplicity and compactness of the Wing Scruplex Fan. Static pressures as high as 1½" are easily attainable, but its field is principally within what might be termed the economical pressure range for handling air in ventilating systems, namely, from ⅜" to 1" static.

These units are made direct motor driven, the motor being located entirely outside of the air handled by the Exhauster, which keeps the motor clean, cool and accessible. The driving shaft and the interior bearing, are both protected by a tube through which fresh air is continually circulated. All lubrication is effected from the outside, motor end. Air laden with grease, smoke vapors, chemical fumes, paint spray, or extreme heat, is handled without injury to any part of the equipment.



Furnished with inlet at top, bottom, or either side, or two inlets

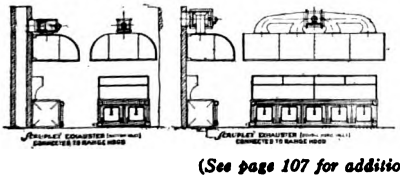
When installed, the Exhauster forms an elbow in the run of the duct, thus greatly economizing in space and installation cost.

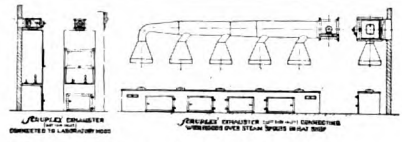
The following table lists standard size Exhausters. Larger sizes made on special order. Complete capacity and pressure data upon request.

SPEEDS AND CAPACITIES

Size	Speed R.P.M.	Delivery C.F.M.	Diameter of Outlet
1-A	1750	900	10"
2-A	1150	1,400	14"
2-B	1750	2,100	
3-A	1150	2,900	17"
3-C	1750	4,400	
4-A	1150	3,550	21"
4-C	1750	5,400	21"
5-A	1150	5,500	25"
5-B	1750	8,300	
6-A	600	6,000	30"
6-B	850	8,500	
6-C	1150	11,500	

The diagrams following give a general idea of how well the Wing-Scruplex Exhauster is adapted to any duct system.





"WING-SCRUPLEX" FANS:

The Wing-Scruplex Fan by its fine screw propeller design accomplishes what has been the aim of fan manufacturers for a great many years, namely, the delivery of a non-expanding column of air of the same diameter as the fan itself and of practically uniform velocity over its entire area. These features tend toward extremely high efficiency, particularly when working against resistance such as is offered by ductwork in a ventilating system. They may therefore be used very advantageously not merely for open ventilation, but for drawing or forcing air through duct-work as well.

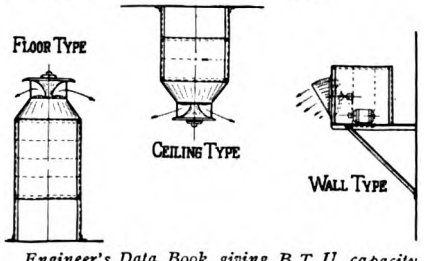


The motor is fully enclosed and dust-proof and is so liberally rated as to require no cooling device. It is mounted complete with the fan on a supporting ring of substantial design. These fans are regularly supplied in the following sizes, *viz.*, 10", 13", 17", 22", 25", 30", 36", 42", 48", 54", 60", of two different capacities in each size. Larger sizes on special order.

"WING-SCRUPLEX" UNIT HEATER:

Wing-Scruplex Unit Heaters are used for heating factories, foundries, and industrial plants of all kinds, garages, warerooms, etc., and also for preventing fogging and precipitation in Dye Houses, Paper Mills, etc.

They economize in steam for the reason that they confine their effect to the working areas, eliminating the unnecessary heating of over-head space. Air is recirculated through the heaters by an efficient motor driven fan, at the top or bottom of the heater according to the type. Made in three different types as shown in diagram below, and several sizes in each type.



Engineer's Data Book, giving B.T.U. capacity, dimensions, direct radiation equivalents, etc. of each size, cheerfully sent upon request.

(See page 107 for additional products of this Company)

Digitized by Google

THE H. B. SMITH CO.

WORKS: WESTFIELD, MASS.

WESTFIELD, MASS.: 57 Main Street
NEW YORK: 10 E. 39th Street BOSTON: 640 Main Street, Cambridge
PHILADELPHIA: 17th and Arch Streets

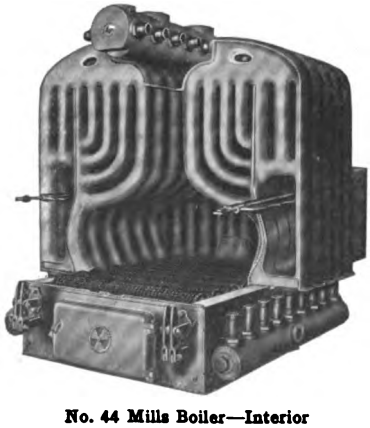
Manufacturers of Boilers and Radiators for Steam and Water Heating

MILLS WATER TUBE SECTIONAL BOILERS:

A. S. M. E. Standard



No. 44 Mills Steam Boiler



No. 44 Mills Boiler—Interior

MILLS WATER TUBE BOILER

Size of Boiler	Nominal Width Fire Pot	Commercial Rating Capacity in Sq. Ft.	
		Steam	Water
No. 24	24″	900 to 2025	1500 to 3350
No. 34	34″	2000 to 5200	3300 to 8575
No. 44	44″	3600 to 9000	5950 to 14850
No. 48	48″	4800 to 12000	7925 to 19800

H-B BOILERS:



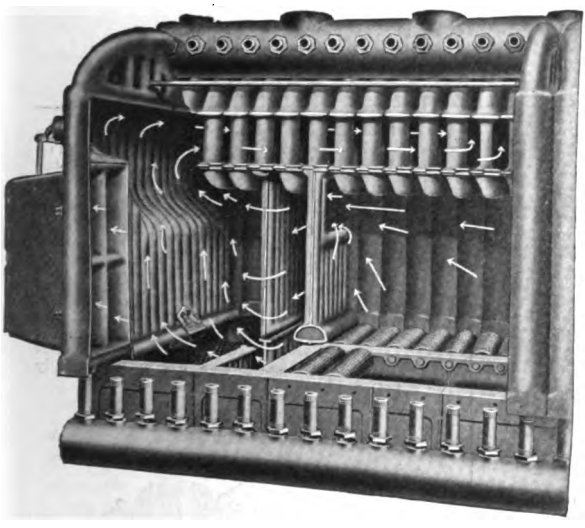
COMMERCIAL RATINGS

Diam. of Fire Pot Inches	Steam	Water
	Rating Feet	Rating Feet
15 to 27	250 to 1000	425 to 1650

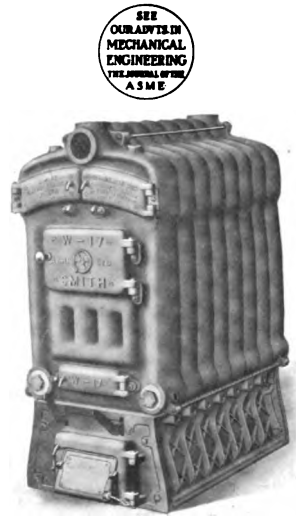
Send for bulletins and catalogues giving complete information.

Digitized by Google

THE H. B. SMITH CO. WESTFIELD, MASS.



No. 60 Smith Boiler with Smokeless Furnace



Smith Service Boiler W-17

SMITH SECTIONAL BOILERS:

With or without Smokeless Furnace for Bituminous Coals

STEAM

Size of Boiler	Width of Fire Pot	Rating Feet of Radiation	
		Without Smokeless Furnace	With Smokeless Furnace
No. 27	27″	1200–3900	1500–2900
No. 36	36″	2300–6800	2750–5400
No. 60	60″	6000–18000	6600–15600

WATER

Size of Boiler	Width of Fire Pot	Rating Feet of Radiation	
		Without Smokeless Furnace	With Smokeless Furnace
No. 27	27″	1975–6425	2475–4775
No. 36	36″	3800–11225	4550–8900
No. 60	60″	9900–29700	10900–25750

Catalogs, bulletins and performance data of boilers will be sent upon request. Send for Catalog No. 1146.

SMITH SERVICE BOILER W-17:

For Hot Water Supply

A. S. M. E. Standard.

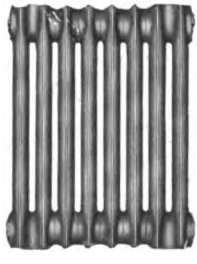
Maximum Allowable Working Pressure 160 lbs. Open Tank; 80 lbs. Closed Tank

PRINCESS DIRECT RADIATORS:

PRINCESS WALL RADIATORS:

For Steam or Water Heating

Made in varying heights in single two, three, five column and wall radiators.



Princess Wall

Send for Radiator Catalogue No. 1010 Wall Catalogue No. 1224.

Digitized by Google

AUTOMATIC CARBONIC MACHINE CO.

MAIN OFFICE AND WORKS: PEORIA, ILL.

BRANCHES

CHICAGO DETROIT ST. LOUIS

Manufacturers of Carbonic Refrigerating Systems

PRODUCTS:

AUTOMATIC CARBONIC MACHINES for Refrigeration and Ice Making—Brine System and Direct Expansion System.

ENGINEERING SERVICE:

We maintain a complete engineering staff for the purpose of advising those contemplating the installation of Refrigerating Machines. This Engineering Staff also gives Service on all AUTOMATIC EVERCOLD installations.

Reg. U. S. Pat. Off.

Sizes:

Made in capacities of 500 lbs. to 500 tons for all purposes.

Purposes:

For all Refrigeration and Ice Making Purposes—for Hotels, Clubs, Public Buildings, Hospitals, Creameries, Restaurants, Butcher Shops, Apartment Buildings, Bakeries, Ice Cream Manufacturers, Steamships, Oil Industry, Ice Making Plants, Storage Warehouses, Produce Houses, Etc.

Advantages:

628 The AUTOMATIC EVERCOLD is a positively safe Refrigerating Machine. It utilizes Carbonic Gas (CO_2) which is easily obtained. CO_2 is non-explosive, non-inflammable and non-asphyxiating.

Condensers and Brine Coolers are shell type which are the most efficient inasmuch as only two gas joints are necessary, thus eliminating gas leaks. This type gives better cooling and is most compact.

It requires very little attention.

It produces economical refrigeration.

Being fully automatic in operation it does not require an Engineer to operate.

It requires less floor space for installation.

Minimum amount of water used because of automatic water control.

The Cycle of Mechanical Refrigeration:

Every Refrigeration equipment of the compression type consists of three principal parts, namely the compressor, the condenser, and the evaporator.

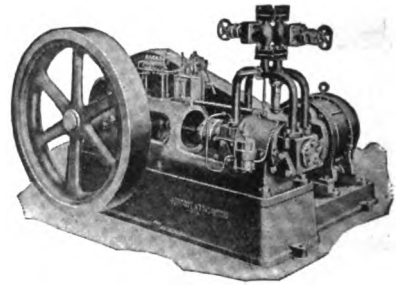
In the AUTOMATIC EVERCOLD system, the carbonic gas is forced from the compressor into the condenser under pressure. During the process of compression the temperature of the gas rises. When the gas enters the condenser, the cooling water circulating inside the coils forces the gas in the shell to give up its heat, and the gas liquefies.

The liquid gas is then conducted to our Automatic Pressure Relation Expansion Valve, which admits a fixed quantity of liquid gas into the evaporator at reduced pressure. Here the liquid evaporates, thereby producing a low temperature. It is this low temperature of evaporation that does the refrigerating work. The gas is then returned to the compressor and the cycle is complete. The cycle repeats itself continuously.

The EVERCOLD System is Automatic.

No skilled engineers or attendants are required to operate the AUTOMATIC EVERCOLD because the system is controlled automatically. The four points of automatic control govern: (1) gas, (2) pressure, (3) water and (4) temperature.

GAS—a gas container is connected with the carbonic gas pipe line to supply the small losses of gas unavoidable in the practical operation of the refrigerating machinery. The flow of gas from this container is so controlled by a *Gas Regulating Valve* that losses are automatically replenished.



PRESSURE—The relation between the pressure in the condenser and the pressure in the cooler is set and maintained automatically by the Pressure Relation Valve between the condenser and the cooler. This is in tune with the Gas Regulating Valve, and the two together maintain constant pressures through the entire refrigerating cycle.

WATER—A Water Regulating Valve is exposed to the Condenser water temperature. As the water temperature rises this valve opens and passes the required amount of water. When the machine shuts down the temperature of the water falls and the water control valve closes, thus saving water waste.

TEMPERATURE—When the Refrigerators are cooled to the required temperature the motor is automatically stopped. When the temperature rises to a predetermined point the compressor starts again. However, when the brine system is used, and it is the one that we recommend, the brine pump motor operates continuously, circulating cold brine through the boxes or places to be cooled at all times and thus maintains a constant temperature, giving efficient refrigeration at less power cost.

SERVICE—We maintain a staff of skilled men to give Refrigerating Service. This insures the operation of your system at the highest efficiency at all times.

Let us give you, without obligation, complete facts and figures on how the AUTOMATIC EVERCOLD will save you money in refrigeration. Outline your requirements briefly so we can submit definite figures.

When you think of ICE think of US.

Digitized by Google

THE AUTOMATIC REFRIGERATING CO.

MAIN OFFICE AND WORKS: HARTFORD, CONN.

BRANCH SALES AND SERVICE OFFICES:

New York City
Boston, Mass.
Chicago, Ill.
Atlanta, Ga.
Huntington, W. Va.
San Francisco, Cal.
Los Angeles, Cal.
Seattle, Wash.
Rochester, N. Y.
Philadelphia, Pa.
Jacksonville, Fla.
Washington, D. C
Columbus, Ohio
Louisville, Ky.
New Orleans, La.
New Haven, Conn.

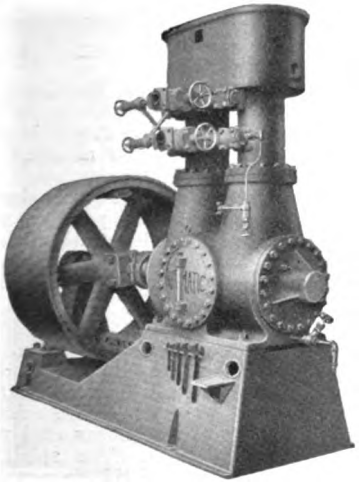
AGENCIES: Baltimore, Md.; Houston, Tex.

AUTOMATICALLY CONTROLLED REFRIGERATING AND ICE-MAKING PLANTS:

These plants (fully patented) are designed to provide mechanical refrigeration without the necessity of an operating engineer. Automatic devices absolutely control starting and stopping of machine as temperatures in boxes rise above or fall below predetermined points, and also control ammonia expansion and feed of water to condenser. Safety devices immediately stop plant in case of trouble and automatically start the plant again when the cause of the trouble is removed.

TRADE MARK

Compressors: The compressors are of the vertical, two cylinder, single acting enclosed type of rugged construction built to gauge with parts interchangeable. They have safety heads, balanced suction valves and adjustable discharge valves. Cylinders and pistons are specially designed to prevent oil pumping into expansion piping. All wearing parts can be replaced at small expense from the large stock of parts always carried. Machines of this construction can never wear out, and can always be kept at the highest efficiency.



Compressor Capacities: Single units from 1000 pounds to 32 tons Refrigeration per 24 hours.

Automatic Control: The control equipment is thoroughly reliable, and is rugged in construction.

Thermostat: The Thermostat automatically controls the starting and stopping of the machine so as to maintain any desired temperature within a degree or two of a predetermined point. It insures that power is consumed only when the temperature requires it. As it is used with our automatic electric control panel, there is no arcing or pitting of the contact points.

Automatic Expansion Valve: The Expansion Valve automatically controls the feed of ammonia to the expansion coils, thus maintaining the most economical pressure for the expansion of the liquid ammonia in the coils. It is easily adjusted, and functions perfectly

Automatic Water Regulator: The Water Regulator automatically controls the flow of water to the condenser and automatically adjusts the water use to the requirements of the plant. The action of the water valve is powerful and positive, and water waste is eliminated.

Automatic High Pressure Safety Cutoff: This device automatically stops the machine should the head pressure approach the danger point, due to failure of water supply or any other cause. It puts the plant in operation again when the cause of the high pressure is eliminated.

Repair Parts: All parts of the plant are of superior construction and are interchangeable. A stock of parts is always carried which can be shipped promptly from our nearest branch office.

Advantages: The Automatic Refrigerating plant will produce refrigeration at a lower cost than any other electrically driven refrigerating machinery. The plant requires practically no attention other than occasional oiling and cleaning of the machinery.

The many advantages of refrigeration by direct expansion can be fully realized through the Automotic plant. There are many Automatic plants cooling from ten to fifteen refrigerators at any desired temperature on the one direct expansion system. Automatic control can be provided with either direct expansion or brine circulation systems.

IMPORTANT:

An Automatic plant can be located anywhere in a building without reference to the location of the engine room. This is an especially desirable feature for engineers designing equipment for factories and public buildings.

Engineers and Architects are urged to use the expert services of the Engineering Department of this Company to assist them in the solution of special problems in application of mechanical refrigeration. Factory drinking water, Restaurant and Commissary Department installations are applications whose possibilities are beginning to be appreciated.

Digitized by Google

CARBONDALE MACHINE COMPANY

GENERAL OFFICE AND WORKS

CARBONDALE, PA.

BRANCH OFFICES

NEW YORK, N. Y., 175 Christopher St.
BALTIMORE, MD., 304 Continental Bldg.
PHILADELPHIA, PA., 1009 Harrison Bldg.
LOUISVILLE, KY., 217 Norton Bldg.
CHICAGO, ILL., 1325 Manhattan Bldg.
NEW ORLEANS, LA., 638 Camp St.
PITTSBURGH, PA., 1122 Allegheny Ave.
BUFFALO, N. Y., 380 Ellicott Sq. Bldg.
KANSAS CITY, 1403 Waldheim Bldg.

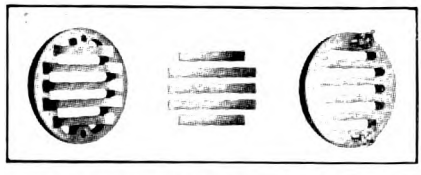
PRODUCTS:

Refrigerating Machines (Ammonia Compression and Exhaust Steam Absorption Systems); Paraffine Wax Machinery, consisting of Distillate Chilling Machines, Hydraulic Filter Presses, Pumping Equipment, Sweating Pans, etc.; Ice-Making Plants; Steam and Power Aqua Ammonia Pumps; Ammonia Economizers; Brine Coolers; Ammonia Fittings; Liquid Carbonic Acid Gas Plants. We are prepared not only to furnish these machines but to design and install complete plants.

REFRIGERATION:

The line of Ammonia Compressors, together with the "Carbondale" Exhaust Steam Absorption Machine, enables us to meet the requirements of refrigeration for any purpose. The Ammonia Compressor is the Feather Valve (Registered U. S. Patent Office) Compressor built at the Laidlaw Works of the Worthington Pump & Machinery Corporation for exclusive engineering by us.

Some Advantages of Feather (Reg. U. S. Pat. Off.) Valve Used in Carbondale Compression System.



Worthington Feather (Reg. U. S. Pat. Office) Valve

The steel strips weigh less than a half ounce making a quiet, durable valve that is in decided contrast to the old, heavy, cumbersome types. The valve has no springs, buffer plates or cushioning devices. Seating is by contact—not impact. Pressure on the extremely flexible strips makes the valve tight—no leakage.

We are prepared to furnish Feather Valve Ammonia Compressors in the following combinations: Single Cylinder and Duplex Belt Driven; Duplex and Two-Stage Direct Connected to Electric Motor; and Single and Duplex Steam Driven, using slide valve, Corliss, Corliss Compound or Stumpf Uni-Flow Engine direct connected for operating same.

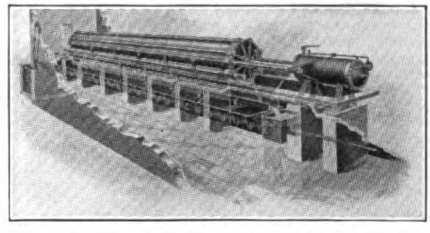
Advantages of Carbondale Absorption Refrigerating and Ice Making Machinery:

(1) Will operate with exhaust steam under a slight back pressure. (2) No heavy moving parts. (3) Noiseless. (4) No heavy foundations. (5) Very little attention required. (6) Adapted for any floor space or headroom.

CHILLING MACHINE:

The Carbondale Patented Distillate Chilling Machine offers the most efficient method of cooling both medium and zero cold test oils.

FILTER PRESS:



Hydraulic Ended Filter Press Showing Conveying Mechanism

The Carbondale Filter Press, having flexible plates, is especially adapted for filtering under high pressure.

It is used for the efficient separation of solids from liquids, such as paraffine wax from petroleum distillates, carbon from coal tar and for other purposes where high pressures are necessary in the operation.

CARBONDALE SERVICE:

In our plant at Carbondale, Pa. we maintain a large staff of engineers specially trained in solving refrigeration problems. Their services are freely offered to architects, engineers and purchasers without charge. The spirit of coöperation evidenced by this department has been a large factor in placing successful installations in such plants as these: E. I. du Pont de Nemours Co.; Walter Baker Co.; Standard Oil Company; Armour & Company; Chapin-Sacks Mfg. Company; Buffalo Cold Storage Company; Crane & Company; LaSalle Hotel, Chicago.

Digitized by Google

YORK MANUFACTURING CO.

Ice Making and Refrigerating Machinery Exclusively

MAIN OFFICE AND WORKS

YORK, PA.

BRANCH OFFICES

BOSTON, MASS., 88 Broad Street
BROOKLYN, N. Y., 42nd St. & 2nd Ave.
BUFFALO, N. Y., 78 Main Street
PHILADELPHIA, PA., 2222–28 Arch Street
PITTSBURGH, PA., 47–49 Terminal Way, S. S.
CLEVELAND, OHIO, 1106–08 Woodland Ave.
ATLANTA, GA., 116–18 Central Ave.
CHICAGO, ILL., 1113–1123 Cornelia Ave.
OMAHA, NEB., 1213–17 Jackson Street
ST. LOUIS, MO., 117–19 South 11th Street
DENVER, COLO., 2121–31 Market Street
HOUSTON, TEXAS, 2201 Texas Ave.
NEW ORLEANS, LA., 619 Baronne Street
SAN FRANCISCO, CAL., 832–38 Folsom Street
LOS ANGELES, CAL., 306–308 Boyd Street
SEATTLE, WASH., 508 Terry Ave., North
TORONTO, CAN., CANADIAN ICE MACHINE CO., LTD., Villiers & Munition Streets

PRODUCTS:

ICE MAKING and REFRIGERATING MACHINERY which includes: Compression Refrigerating Machines, Absorption Refrigerating Machines, Ice Making Plants, Refrigerating Plants, Ammonia Valves, Ammonia Fittings, Ammonia Condensers, Brine Coolers, Aqua Ammonia Pumps, Ice Cans, and all parts needed to equip a complete ice making or refrigerating plant.



Vertical Single-Acting Enclosed Refrigerating Machine

DESCRIPTION:

We make, in our own factory, all the machinery and apparatus used in ice making and for general refrigeration, confining ourselves to the ammonia system, both compression and absorption types, and the CO_2 system.

SIZES:

The enclosed machine is built in sizes from ⅛ ton refrigerating capacity upwards; the vertical single-acting machines from 20 to 600 tons; the horizontal double acting machines from 10 to 600 tons—either belt or steam driven type. Ammonia absorption and carbon dioxide (CO_2) machinery of any capacity required by the trade.

APPLICATION:

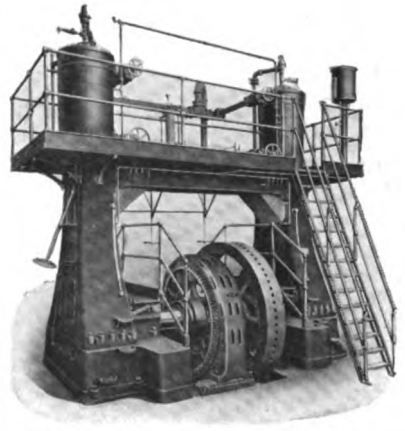
These machines can be used wherever ice making or refrigeration is required, the style of machine being determined, to a great extent, by local conditions.

The enclosed machine is particularly adapted for residences, apartment houses, small hotels, creameries, ice cream factories, etc.

VALVES AND FITTINGS:

York ammonia valves and fittings are guaranteed to give satisfaction under all usual working pressures.

631



Vertical Single-Acting Semi-Enclosed Refrigerating Machine, with Direct Motor Mounting

SERVICE:

All York agencies carry in stock a complete line of ammonia valves and fittings, also a line of enclosed machines.

What a service department is to the owner of an automobile, the York Sales Organization is to the user of ice making and refrigerating machinery.

Both *quality* and *service* can be secured by patronizing the York Organization.

Digitized by Google

HENRY VOGT MACHINE CO.

LOUISVILLE, KY., U. S. A.

BRANCH OFFICES—NEW YORK—CHICAGO—TULSA, OKLA.

Manufacturers of Ice and Refrigerating Machinery, Water Tube and Horizontal Return Tubular Boilers, Sectional Steel Boiler Casings, Drop Forged Steel Valves and Fittings, Oil Refinery Equipment, Paraffine Wax Presses, Distillate Chilling Machines for Cold Test Oils, Welded Vessels, Sectional Rocking and Dumping Grates

REFRIGERATION:

Vogt

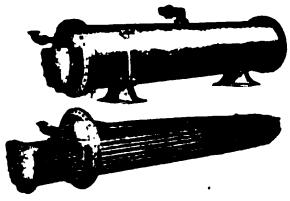
TRADE MARK

Forty years of effort in the design and construction of the Vogt Absorption Machine have brought forth the present economical and efficient Exhaust Steam unit. By an exhaust steam unit is meant a refrigerating machine capable of developing its rated capacity through the use of steam that has already performed useful work.

A further economy is effected by combining the exhaust steam refrigerating machine with any mill, light or power plant, the refrigeration or ice so produced being virtually a by-product. When it is understood that the operation of such a machine is possible without the introduction of any complicated parts, our correctness of design is thoroughly established.

The workmanship and materials used on our machines are the very best, our drop forged valves and fittings being one of the superior features.

VOGT EXHAUST STEAM AMMONIA GENERATOR (Patented):



Designed to operate on the lowest possible steam pressure.

The shell and heads are made of semi-steel, this metal being the most durable in contact with hot ammonia.

The coil is made of straight extra heavy wrought iron pipe, and each pipe is closed at one end. The steam is delivered through an inside pipe at the closed end and travels only one time the length of the Generator. This eliminates friction and enables operation at minimum pressure.

Other special features are:

No Return Bends. No Bent Pipes. No Exposed Heating Surface. No Stuffing Boxes on Steam Coils. No Threaded Joints inside of Shell.

VOGT AQUA AMMONIA PUMP:

The Vogt Aqua Ammonia Pump is designed to handle strong aqua ammonia. The steam cylinder is equipped with balanced piston type valve, governed by an auxiliary valve which is mechanically operated. The steam consumption is exceedingly low for this type pump and the speed is automatically controlled at any desired number of strokes by means of a Mason Regulator. The ammonia cylinder is provided with an extra long stuffing box and water chamber.



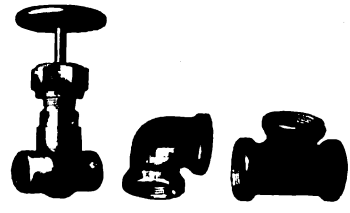
The ammonia piston rod is made of special steel and connected with coupling to the steam piston rod so it can be easily removed when necessary.

The pump is mounted on a heavy sub-base.

DROP FORGED STEEL VALVES AND FITTINGS:

The purchase of low grade valves and fittings is false economy. The one consideration that should govern the choice of valves and fittings is their permanent value—not their first cost factor. The purchaser who overlooks this wide difference between value and price, overlooks the inevitable losses through leaks and breakage which are invariably in excess of the money originally saved.

Vogt forged valves and fittings are in daily service, frequently subjected to intense pressures which no other fitting but a Vogt could withstand. They are especially adapted for high pressures of air, steam, gas, ammonia, water and oil. For the manufacturer of chemicals, of explosives, of hydraulic equipment; for the factory, the mill and the mine these fittings are no experiment—they are a daily necessity.



With a record of excellent service and a guarantee of satisfaction Vogt forged valves and fittings are the logical selection—there can be no reason for not specifying them.

Digitized by Google

HENRY VOGT MACHINE CO. LOUISVILLE, KY.

THE VOGT WATER TUBE BOILER:



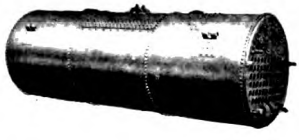
The exacting requirements of the modern Power Plant are satisfied by Vogt Water Tube Boilers.

Continuous high economy is obtained, due to the design of the boilers and the arrangement of the furnaces for the proper combustion of the fuel.

Low cost of maintenance is secured by the elimination of numerous handholes at ends of tubes and by the accessibility for cleaning and inspection, also by the flexibility of construction, effected by the method of suspension which allows for the freedom of expansion and contraction.

High grade workmanship and materia are embodied with the most advanced boiler practice, which complies fully with the new A. S. M. E. Boiler Code.

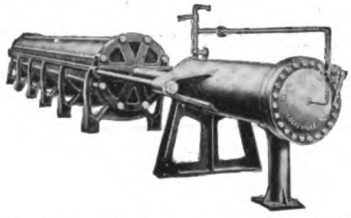
THE VOGT HORIZONTAL RETURN TUBULAR BOILER:



Vogt Horizontal Return Tubular Boilers are constructed in accordance with the new A. S. M. E. Boiler Code for 125 and 150 pounds working pressure and range in capacity from 45 to 250 horse power.

The equipment is arranged to assure ample space between the grates and the bottom of the boiler, also a large combustion area in rear of bridge wall, thus meeting the present-day demand for economical fuel consumption.

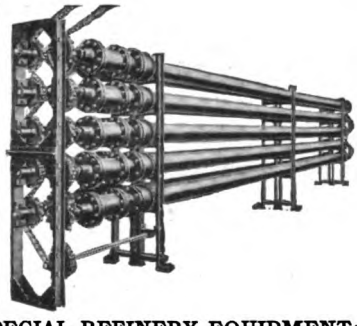
VOGT PARAFFINE WAX PRESS:



The heavy rigid construction of Cylinder and Press Supports minimizes the wearing of the machine. The weight is so evenly divided that the wear and tear on the Ram Cylinder and Stuffing Box is practically eliminated—made for either the loose ring or riveted ring type of Filtering Plates and adapted to filter under pressure from 300 to 500 pounds to the square inch—all castings made of semi-steel which assures strength and freedom from breakage.

VOGT DISTILLATE CHILLING MACHINE:

Operates with the minimum amount of power—The small number of Stuffing Boxes and rigid construction of the Driving Gear are power saving features— All castings of the Vogt Chiller and Driving Gear are of semi-steel. The Distillate Pipes (inner pipes) are of wrought iron made in one length to special specifications and uniform size—They are guaranteed to be free from blisters, allowing smooth running of the Screw Conveyors.



SPECIAL REFINERY EQUIPMENT:

The Henry Vogt Machine Company manufactures complete Wax Plant Equipment and is equipped to construct special machinery to specifications furnished by Refineries.

Illustrated Bulletins containing detail description of our products will gladly be sent you upon request.

SEE OUR ADVTS. IN MECHANICAL ENGINEERING THE JOURNAL OF THE A.S.M.E.

Digitized by Google

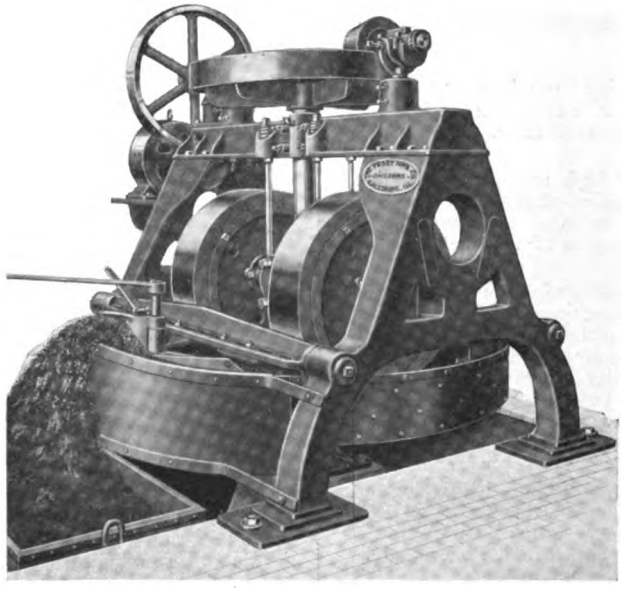
THE FROST MANUFACTURING CO.

Established 1851

WORKS: GALESBURG, ILL.

GENERAL SALES OFFICE: 112 W. ADAMS ST., CHICAGO, ILL.

Manufacturers of the Frost Wet Pan for Steel Foundries
Also Dry Pan for Clay Crushers



Frost

WET PAN SAND MILL:

For Preparing Sand

for Foundry Mixtures.

The Frost Sand Mill is built on the principle of plowing, turning, kneading, and pressing the sand and materials to be mixed. We use heavy mullers bearing on chilled iron grinding plates which revolve in a plane at right angles to and immediately underneath and in contact with the mullers. Aided by centrifugal force, the mixture is thrown out by the mullers to be turned by the plows and again guided or plowed back under the mullers. When the mixing is through (a matter of from one to two minutes), the unloader, which at other times serves as one of the plows, is set and the mixture immediately discharged from the pan.

Spring suspension of mullers enables operator to gauge pressure exerted to requirements of the mixture.

Our design is such that parts which take the wear of the milling and kneading can be renewed at a minimum cost.

Furnished for direct connected electric or belt drive.

Built in sizes of from ½ to 1½ yards capacity per batch.

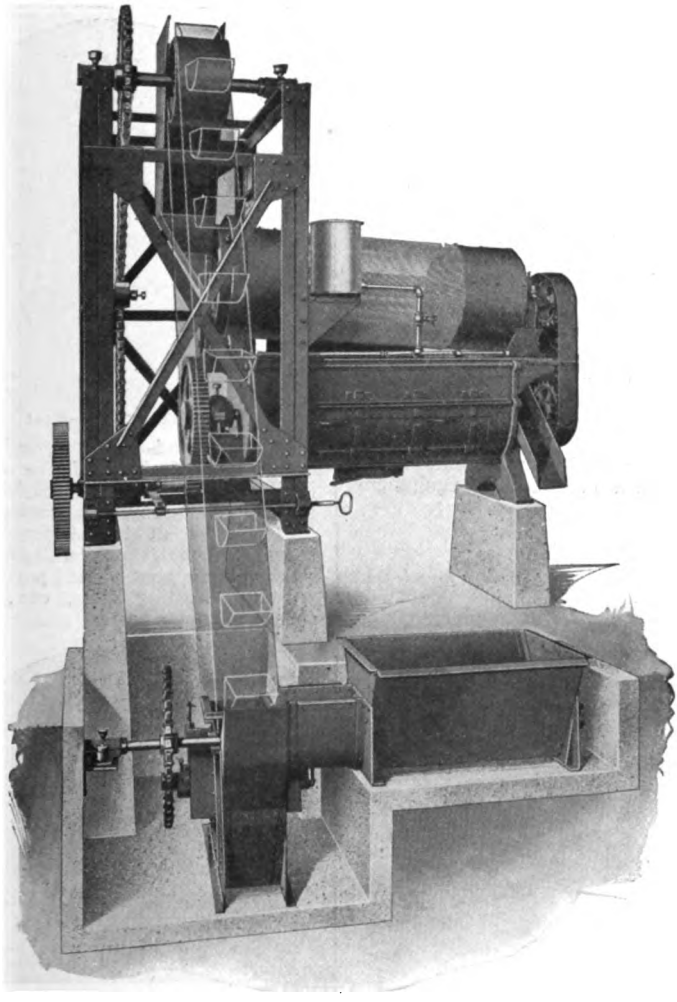
(See page 68 for additional products of this Company)

Digitized by Google

THE STANDARD SAND & MACHINE CO.

5151 St. Clair Ave., CLEVELAND, OHIO

Manufacturers of Sand Handling Machinery



The Standard Sand & Machine Company manufacture Core and Facing Sand Mixers that fit into the modern foundry of today.

They are used in connection with continuous pouring plants, and as independent units. They mix, screen, and temper core or facing sand in one operation.

They save floor space and power per ton of sand handled.

They are built for service.

They are in their twenty-first year of success.

Engineers should have data on these machines in their files.

Digitized by Google

PANGBORN CORPORATION

P. O. BOX 859, HAGERSTOWN, MD.

Engineers, Designers and Manufacturers Exclusively of
SAND-BLAST AND ALLIED EQUIPMENT

PANGBORN
HAGERSTOWN, MD.
SAND-BLAST SPECIALISTS

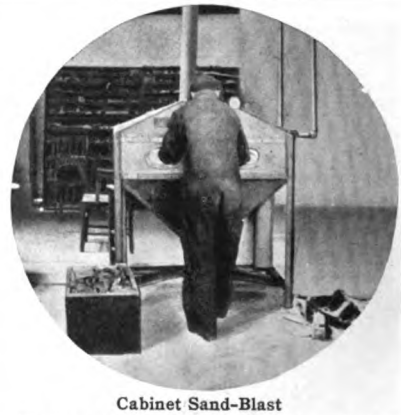
The "Pangborn" line embracing, as it does, every practical system of sand-blasting, assures the user of counsel unbiased by limited designs and equipment. Hose Sand-Blasts, Sand-Blast Guns, Cabinet, Table and Barrel Sand-Blasts in single units or in combination and with specially designed rooms and ventilating systems to meet the individual conditions, cover every demand from the smallest to the largest.

A corps of experienced Sand-Blast engineers study individual problems, assuring equipment and arrangement so necessary to economy of production. Detail of your needs and conditions will bring literature of adaptable equipment.



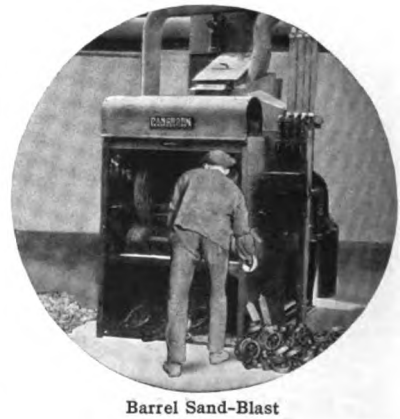
Hose Sand-Blast

Hose Sand-Blast: The Standard Direct Pressure Sand-Blast and the most effective of the various designs and types of Sand-Blast Equipment. Will do work possible with any type of sand-blast. It is particularly adapted to large pieces or extensive surfaces and work of a varied character. Made in several sizes and designs for installing either on the floor level, or in pit below the floor for continuous gravity feed. Also open hopper types for limited demands.



Cabinet Sand-Blast

Cabinet Sand-Blast: A self-contained Sand-Blast Machine of the continuous feed, suction type, occupying small space. It represents a complete Sand-Blast device at lowest first cost—designed for small pieces, light work or small volume, heat treated parts, "matte" finishing, frosting glass, etc., made in other designs and sizes.



Barrel Sand-Blast

Barrel Sand-Blast: The most rapid and economical method of cleaning quantity production of work too small for individual handling—Gravity feed, full value of air pressure. Self-contained, continuous feed, substantially built, requires no pit or foundation.

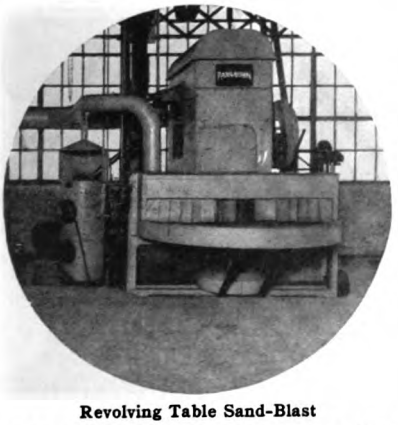
Will take pieces up to limit of door opening. Made in three sizes.

Digitized by Google

PANGBORN CORPORATION HAGERSTOWN, MD.

PANGBORN HAGERSTOWN, MD. SAND-BLAST SPECIALISTS

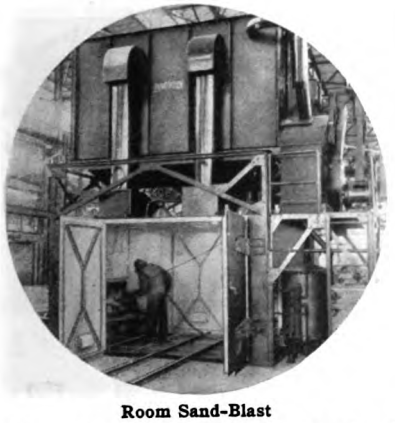
Revolving Table Sand-Blast: An automatic, continuous feed, direct pressure, hygienic Sand-Blast for work of precision that would suffer from contact, fragile castings, or castings, forgings, etc.,



Revolving Table Sand-Blast

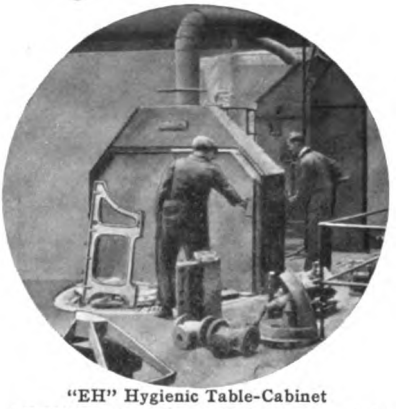
of odd or cumbersome shapes not adaptable to other methods of cleaning. Work loaded and unloaded as table revolves —Blasting operation enclosed—Operator works in the open.

Made also in other types for crockery, glassware, etc.



Room Sand-Blast

Room Sand-Blast: A complete Sand-Blast Installation with direct pressure Hose Machine (structural steel room)—Abrasive falls through grated floor to conveyor and elevator. Separator eliminates coarse and fine refuse from reusable abrasive. Ventilated to ten changes of air per minute. Dust confined in Cloth Screen Arrester. Equipment outside of room—controls within. Room can be equipped with bench, car or monorail as required. Also constructed with rotative table in wall for loading and unloading work from outside.



"EH" Hygienic Table-Cabinet

"EH" Hygienic Table-Cabinet: A hygienic, semi-automatic direct pressure Sand-Blast Installation for work up to 3′ 6″ largest dimension. For use with Hose Machine placed for continuous operation either on floor level or in Pit beneath the Cabinet. Pieces are loaded on the rear of rotative table, the partition of which entirely closes the cabinet, the Operator working on the outside free from flying abrasive and dust.

637



Suction Feed Revolving Table

A small (42″ diam.) Table self-contained for small work in medium volume. Cleans castings, forgings, heat treated parts, stampings, etc. Can be installed with other machine tools. Built in sizes and arrangement to individual requirements.

SEE OUR ADVTS. IN MECHANICAL ENGINEERING THE JOURNAL OF THE A.S.M.E.

Digitized by Google

AMERICAN INSULATING MACHINERY COMPANY

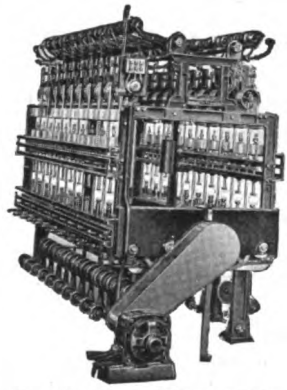
Established 1855 **Incorporated 1915**

ROBT. W. WITHINGTON, President

H. L. BENNER, Secretary and Treasurer

PHILADELPHIA: Main Office and Works
NEW YORK: (Export Office) 17 State St.

ENGLAND: J. B. Hyde & Co., Hale, Cheshire
FRANCE: 10 Rue de L'Elysee, Paris



Double Cover, Cotton or Silk
INSULATING MACHINE

638

WIRE DRAWING MACHINERY.

MAGNET WIRE ENAMELING MACHINES.

COTTON OR SILK INSULATION WINDING MACHINES.

Paper Tape Insulating Machines.
Insulated Wire Reclaiming Machines.

Twinning, Cabling and Bunching Machines.
Measuring and Respooling Machinery.
Saturating Tanks and Tinning Outfits.
Power Driven Pull-Out Capstans.
Multiple Pull-Out Reel Stands with Traverse.
Power Driven Reel Stands with Traverse.
"American" Pressed Steel Reels for Wire, etc.

"American-Seward" Panning Machines for panning Rubber Covered Wires.
Rubber Covered Wire Vulcanizing Pans.
Rubber Covered Wire Patch Vulcanizers.

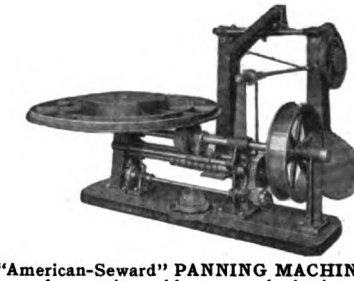
Special Machines Designed or Built.

EST. 1855 AIMCO INC. 1915
"American" INSULATING MACHINERY COMPANY
REG. U.S. PAT. OFF.

PHILADELPHIA PENNSYLVANIA U.S.A.



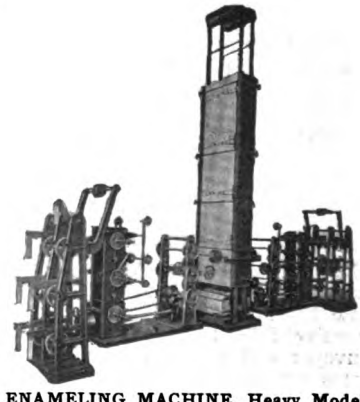
MULTIPLE PULL-OUT with Traverse for 8 Reels, Has 8 Independently Operated FRICTION CLUTCHES



"American-Seward" PANNING MACHINES for panning rubber covered wire in Pans 40", 48", 56", 60", 62" diameter



RAPID CABLING MACHINE
Mounted on Ball-Bearings



ENAMELING MACHINE, Heavy Model for Wire 10 B. & S. to 20 B. & S. Gauge

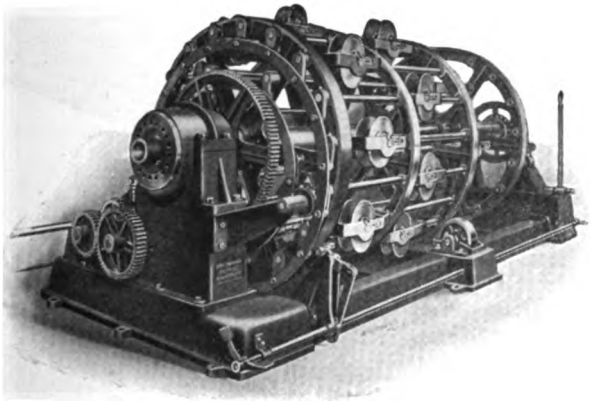
Digitized by Google

NEW ENGLAND BUTT COMPANY

PROVIDENCE, R. I.

European Agents: Selson Engineering Company, Ltd., LONDON, ENGLAND

Manufacturers of Braiding Machinery; Machinery for Insulating Wires and Cables, also Machinery for the Manufacture of Wire Ropes and Cables



Planetary Type Cabling Machine

WIRE ROPE MACHINERY:

Full line of high speed and planetary type machines. Closing Machines for wire rope.

BRAIDING MACHINERY:

Used for making plain and fancy braids for dress trimmings and millinery, round and flat shoe laces, soutache braids, candle wicking, tapes, cords, banding, clothes lines, fish lines, packing, gas tubing and rubber hose, round and flat elastic.

Sash Cord Braiders for making solid sash and curtain cord of various sizes.

Sash Cord Finishers for polishing solid sash cord.

Rubber Spreading Machines, built of any desired width for applying a thin coating of rubber to cloth.

INSULATING MACHINERY:

Single, Double and Triple Deck Braiders:

These are made in all sizes and combinations for covering wires from small sizes up to large cables.

Annunciator Wire Winders, Single, Double or Triple Deck.

Polishing Machines, for insulated wires and cables from the small sizes up to 3" cables.

Wire Measuring Machines.

Twinning Machines.

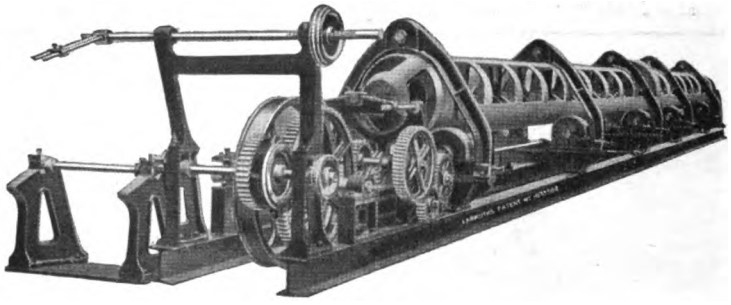
Rubber Strip Covering Machines, for applying rubber insulation to wires and cables with either single or double seam. These machines are built in several sizes and handle from one up to twenty wires at a time.

Digitized by Google

NEW ENGLAND WIRE MACHINERY COMPANY

NEW HAVEN, CONN.

Manufacturers of Wire Stranding and Closing Machines, Insulated Cable and Wire Rope Machinery, and Wire Drawing Equipment.

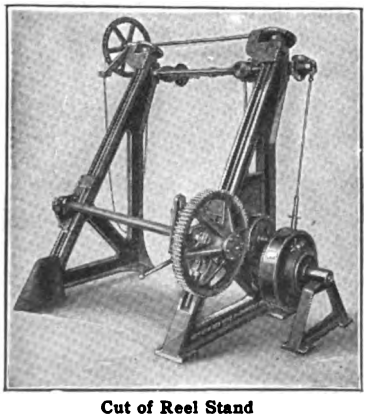


Larmuth High Speed Strander

Complete line of High Speed Wire Stranding Machines (Larmuth's patents). These are high grade machines developed from long experience to meet the most exacting requirements, and to produce a maximum output.

640 The illustration represents type of machines having bobbins 6 ½″ to 24″ diameter and for 3 to 37 wires.

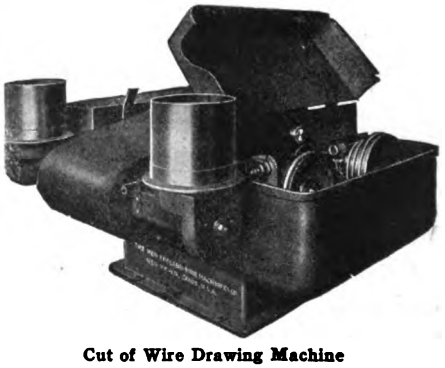
Write for booklet on Larmuth High Speed Stranders.



Cut of Reel Stand

Latest Economy in Reeling.
Built to handle heavy reels.
Standard sizes 64″, 72″ and 84″.
Arranged to suit your requirements.

Write for booklet on reel stands.



Cut of Wire Drawing Machine

Double Tamden Cone Type Continuous Copper Wire Drawing Machine. Each Side can be Operated Independently.

Horizontal type of planetary stranding machine for stranding any number or combinations of wires desired, wire rope or conductor cable.

Closing Machines for wire rope or conductor cable up to bobbins 60″ diameter.

Sector Conductor Stranding Machines.

Bunching Machines
Cotton Wrapping Machines
Twinning Machines
Saturating Machines
Reel Stands
Paper and Varnish Cambric Taping Machinery
Spooling and Bobbing Winding Machinery
Wire Drawing Equipment for steel, copper, brass, etc.
Galvanizing and Tinning Equipment

Complete plans and details of equipment can be furnished for a given output of insulated cable or wire rope.

Digitized by Google

THE TORRINGTON MFG. CO.

Incorporated 1885

TORRINGTON, CONN., U. S. A.

Machinery for the Manufacture of Brass and Copper in Sheet, Tubing and Rod—Special Machinery of Any Description

ROLLING MILL MACHINERY:

For brass, copper, aluminum, sterling and nickel silver, zinc, bronze, steel—or other cold rolling and finishing.

For sheets, strips, plates and rods. Flatteners, straighteners, coilers, slitters, shears, drying machines, scouring machines, saws, mills, stretching machines, rolls, overhauling machines, mill trucks, blockers, etc.

TUBE DRAWING MACHINERY:

For brass and copper tubes or other ductile metals. Draw benches, straighteners, cutting-off saws, testing benches, pointers, die grinders, etc.

WIRE DRAWING MACHINERY:

For wire and rods. Bull blocks, draw benches, air hoists, threshing barrels, die-stringing machines, continuous wire machines, fine wire machines, flat wire mills, trolley wire machines, rolls, straighteners, spooling machines, magnet wire machines, pointers, etc.

CABLING AND STRANDING MACHINERY:

For cabling or stranding individual wires into finished cables, electrical conductors and wire rope. Twisters, twinners, stranders, capstans, spoolers, take-ups, take-offs, etc. Machinery for cables ranging from 2 to 91 wires.

SPECIAL MACHINERY FACILITIES:

For satisfactorily producing special machines, from design to assembly. Drafting room, pattern shop, machine shop, forge shop. Screw machine, turret lathe and grinding departments. Buildings of modern construction. Accuracy and privacy guaranteed.

CONTRACT WORK:

To customers' specifications and drawings of every description.

Digitized by Google

THE DAVIS AND FURBER MACHINE CO.

NORTH ANDOVER, MASS.

Established 1832

Manufacturers of Textile Machinery and Card Clothing for Woolen and Worsted Mills

We have been making woolen mill machinery since 1832.

Our plant is the largest in its line in the United States.

Our machines are the standard for this country, and are continually being exported.

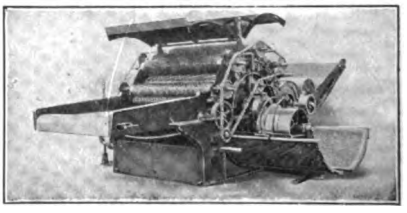
LITERATURE:

Detailed catalogues and circulars are sent on request.

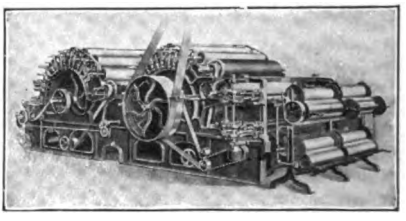
If interested in any of the list given here we should be glad to hear from you.

PRODUCTS:

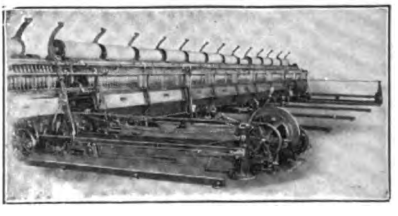
Card Clothing.
Carding Machines for Woolen, Worsted, Mohair, Asbestos, Cotton Waste, Flax Waste, Jute Waste, Silk Waste and Shoddy.
Garnet Breasts.
Condensers or Rubbs.
Card Clothing Grinding Machines.
Wool Pickers.
Wool Dusters.
Spinning Mules for Wool, Shoddy, Cotton Waste, Asbestos, Etc.
Bobbin Winders.
Perches.
Dressers or Slashers.
Beamers.
Reels.
Spoolers.
Skein Spoolers.
Skein Winders.
Twisters.
Chinchilla Machines.
Napping Machines for Woolen, Cotton and Knit Goods.



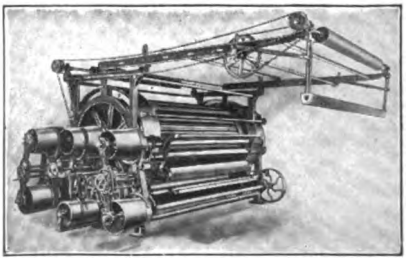
48" Fearnought Picker



60" Double Cylinder Card



360 Spindle Mule



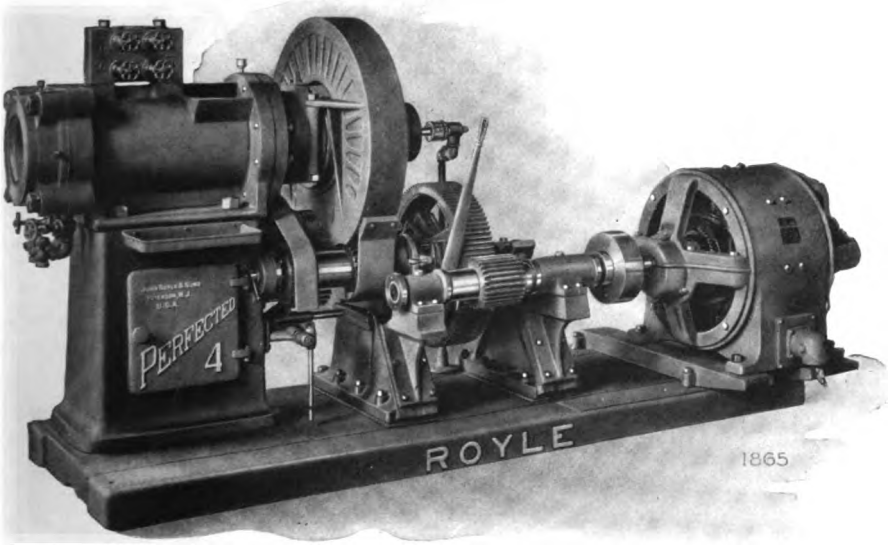
36 Roll Napper

Digitized by Google

JOHN ROYLE & SONS

PATERSON, N. J.

Rubber Tubing and Insulating Machines, Circular Looms, Photo-Engravers' Machinery, Jacquard Card-Cutting Machines



Perfected Tubing Machines are built in six sizes with die range from 0–9 inches. The accessory equipment and fixtures can be modified to meet particular requirements of each individual purchaser.

The smaller sizes are used widely for producing rubber tubing for medicinal and laboratory purposes, gas tubing, and similar articles possible of manufacture by this process. The intermediate and larger sizes are extensively used for running inner tubes, treads, solid tires, and the larger diameters of tubing of all sorts.

The quantitative capacity is very high, approaching upwards of 1,000 inner tubes a day with appropriate equipment.

Catalog 213.

Perfected Insulating Machines are practically the same as tubing machines excepting they have a passage-way from exterior to the die for the wire or other material to be rubber-covered. They are installed by makers of tire beads with wire insertion; electric wire and cables, fabric insertion garden hose, steam packing, and other products. On some sizes of wire, these machines insulate upwards of 175,000 feet per day.

Catalog 213.

Royle Circular Looms weave a firm and dependable circular fabric covering or jacket. They are used extensively by makers of fire, steam, and garden hose, and of other articles requiring a protective fabric covering. Three sizes are made with range of diameters from ½″ to 8″. The construction includes unique features for power control, varying the tension, laying the filling, and take-off.

Circular 295.

Royle Photo-Engravers' Machinery include mechanical devices for about every operation in the mounting and dimensioning of engravings. The several machines are famous for sensitive control, dependable action, and continuous working capacity. The construction is of the "Royle Standard" approved by practical experts everywhere.

Catalog 300.

Digitized by Google

TEXTILE MACHINE WORKS

READING, PA.

Manufacturers of Braiding and Insulating Machinery

Manufacturers of

BRAIDING MACHINES

for all kinds of

Technical Purposes

as well as

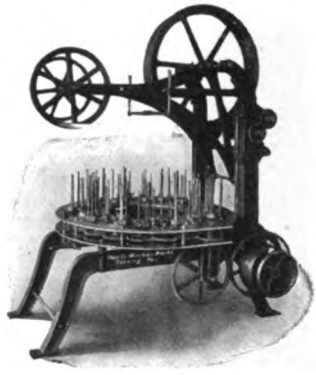
Auxiliary Machinery

used in the

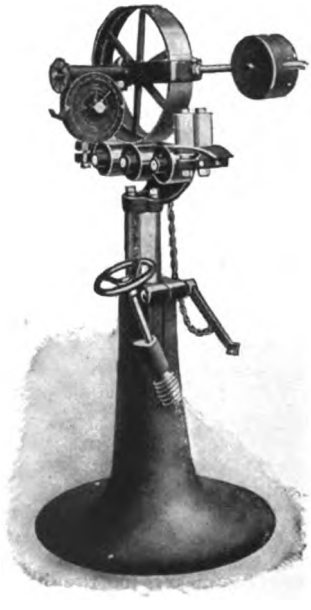
Braiding Industry

HIGH GRADE

GRAY IRON CASTINGS



Rubber Hose Braider



Measuring Machines for Wires and Cables

Digitized by Google

Slat Conveyors, Centrifugal Pumps, Sealing Machines, Mixers

THE UNION ENGINEERING COMPANY

CLEVELAND, OHIO

Manufacturers of Elevating, Conveying and Confectioners' Machinery

PRODUCTS:

Power Transmission Machinery
Mill Machinery
Mining Machinery
Mixing Machinery
Paint Machinery
Varnish Trucks
Plaster Machinery
Excavating Machinery
Brick and ClayWorking Mac hinery
Grain Elevator
Feed Mills
Direct and Steam Heat Dryers
Garbage Disposal Plants
Crushers
Chain Belting
Screens
Coal and Ash Handling Machinery
Loom Machinery
Patent Mixers for
Candy, Ice Cream, Paint, Etc.
Patent Paper Box Sealing Machines
Patent Marking and Cutting
Candy Machines
Can Compressors

We design and Manufacture Special Machinery.

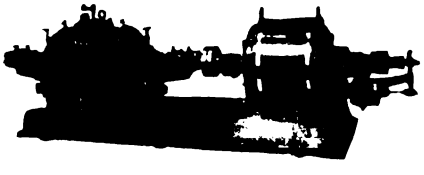
SLAT CONVEYOR:



Standard and special designs for any particular purpose.

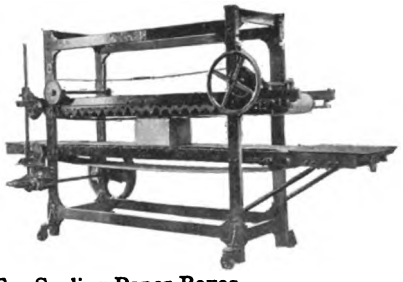
Also belt and chain conveyors, any size or type.

DAYTON CENTRIFUGAL PUMPS:



We manufacture the "Dayton" line of turbine and volute centrifugal pumps, comprising a complete line of both horizontal and vertical or sump pumps.

THE HAHN SEALING AND GLUING MACHINE:



For Sealing Paper Boxes
Patented and Patents Pending

Capacity of the machine is from 3,000 to 5,000 boxes per day, according to speed of operator. Motor or belt drive. Does not require more than 1 H. P. to operate.

Takes boxes from 3 to 20 inches in height and 22 inches wide. Adjustment from the smallest to the largest size box can be made in less than one-half minute. We can make machines for larger boxes, if required.

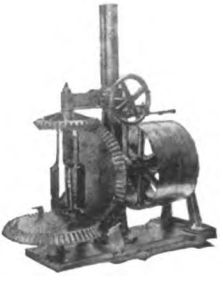
CAN CLOSING MACHINE:



Friction cover can closing machine, for pressing covers on friction top cans. Cap. 20 qt. cans. Adjustment 0 to 8⅞".

Larger size made with foot operated clutch, capacity 30 qt. cans. Adjustment 2" to 11".

PONY PAINT MIXER:



We build a complete line of paint and candy mixing machinery.

Digitized by Google

THE SANDUSKY FOUNDRY & MACHINE CO.

SANDUSKY, OHIO

Manufacturers of Fluid Compressed Tubing, Grey and Chilled Iron, Semi-Steel, Electric Furnace High-Speed Steel Tubes or Hollow Billets for Tool Manufacturers. Finished Hollow Spindles for Machine Tool Makers

FLUID COMPRESSED BRONZE TUBES are the product of a new patented process developed in our own works.



The *process* involves the art of casting in permanent molds and compressing the metal while still in a fluid state.

The *result* is a casting free from blow holes, soft or hard spots, shrinkage cracks, or other latent imperfections. The treatment gives the metal a close and homogeneous grain, a high and uniform density throughout the tube.

We Specialize in Unusual Tubes from any Material and for any Purpose.

The *machining* is done on turning and boring equipments especially designed for the purpose.

Included in our Machine Shop Equipment is the Largest and most Complete Assortment of Turning and Boring Apparatus outside the United States Arsenals.

Range of Sizes: 4″ to 30″ outside diameter, wall thickness from ⅛″ to 1½″, length up to 220″ depending on diameter and wall thickness.

Chemical and Physical Properties of Bronze Tubing: Almost any non-ferrous composition may be furnished. Our Standard No. 1 Sandusky Composition, 85% Cu, 6% Sn, 6% Zn, 3% Pb, and Ni, shows average ultimate tensile, 40,000 lbs. per square inch. Average elongation in 2″—24%. Used largely for propeller shaft sleeves, liners, bushings and roll covers.

Many castings are also furnished of Comp. "G" Navy Specif. 46M6a: 88% Cu, 10% Sn, 2% Zn; No. 4-N Sandusky: 88% Cu, 6½% Sn, 1% Ni, 4½% Zn and Pb—A splendid hydraulic composition used where tubes must stand high external or internal pressures; Naval Brass, Navy Specif. 46B10a: 62% Cu, 37% Zn, 1% Sn. Average Tensile 52,000 lbs. per square inch.

Purposes: Fluid Compressed Tubing of equal density throughout, straight, round, true and concentric, is preferred to tubular products made by usual processes for:

Propeller Shaft Sleeves, Engraving Rolls, Bearing Liners, Roll Covers and Jackets, Bushings, Cylinder Liners for Pumps and Presses, etc.

Patterns are Not Needed: We do not supply *Rough Castings*. For more complete treatise on the subject of Fluid Compressed Tubing send for Bulletin No. 202.

SPECIAL PULP AND PAPER MILL MACHINERY:

A few of the Products made are·

Millspaugh Suction Couch Rolls and Suction Press Rolls.

Millspaugh Shower Pipes.

Press and Breast Rolls covered with Fluid Compressed Jackets.

Now Acknowledged as Standard Equipment and in demand for all new modern Paper Machines.

Digitized by Google

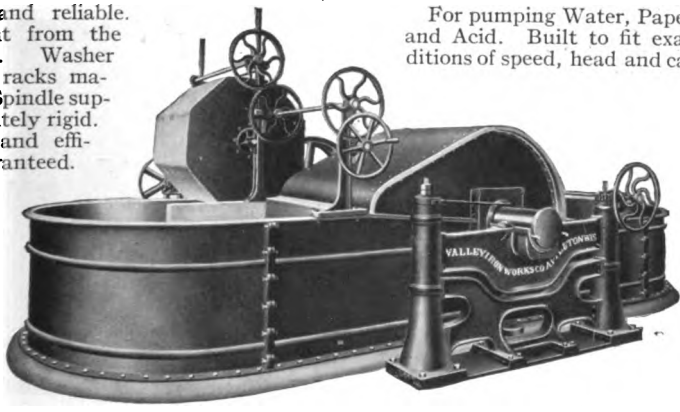
VALLEY IRON WORKS CO.

APPLETON, WIS.

Builders of Fourdrinier Machines, Cylinder Machines, Beaters, Washers, Bleachers, Deckers, Sulphur Burners, Barkers, Shredders, Chippers, Wet Machines, Acid Tanks, Blow Pits, Stuff Chests, Centrifugal Pumps, Marine Engines

BEATERS:

Strong and reliable. Made right from the ground up. Washer gears and racks machine cut. Spindle support absolutely rigid. Long life and efficiency guaranteed.



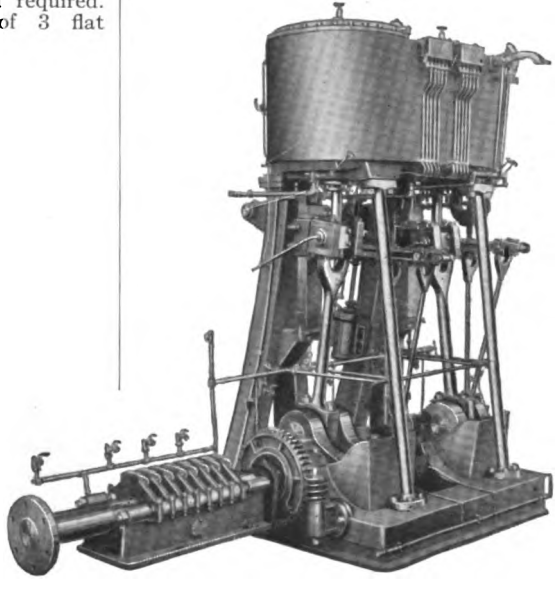
VALLEY IRON WORKS PUMPS:

For pumping Water, Paper Stock and Acid. Built to fit exact conditions of speed, head and capacity. Adapted for continuous running with high efficiency.

VESUVIUS SULPHUR BURNERS:

Well constructed. Strong and substantial. No power or steam required. Self-contained. Does work of 3 flat or rotary burners. Minimum floor space required. Easy to clean when necessary, but seldom necessary. Results guaranteed. Correspondence solicited. Write for cuts and details.





MARINE ENGINES:

Approved by the Emergency Fleet Corporation. Built in sizes ranging from 450 horse power up.

Digitized by Google

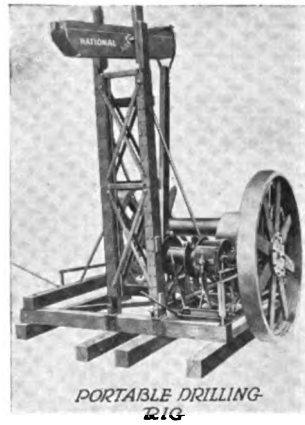
THE NATIONAL SUPPLY CO.

TOLEDO, OHIO

Manufacturers of Oil, Gas and Water Well Machinery, Pipe Line and Refinery Supplies of All Kinds

DRILLING EQUIPMENT:

Special Rig Irons
Standard Rig Irons
Iron Sand Reels
Rotary Drilling Outfits
Portable Drilling Rigs
Mounted Drilling Machines
Drilling and Fishing Tools
Tool Joints
Rotary Shoes and Bits
Drive Shoes
Circulating Heads
Drive Heads
Drilling and Casing Blocks
Steel Crown Blocks
Drive Clamps
Elevators, etc., etc.



PORTABLE DRILLING RIG


CIRCULATING HEAD


ROTARY


SAND REEL


PIPE ELEVATOR

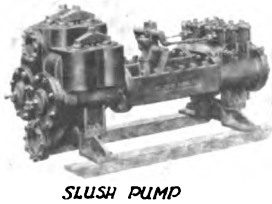

WATER SWIVEL


DRAW WORKS


TOOL JOINT JACK


TEMPER SCREW


DRILLING BLOCK


SLUSH PUMP


WALKING BEAM CENTER IRONS


ROTARY BIT


DRIVE SHOE


MEASURING-LINE REEL


CASING HOOK


STEEL CROWN BLOCK


DRIVE HEAD


DRIVE CLAMPS

Digitized by Google

THE NATIONAL SUPPLY CO. TOLEDO, OHIO

PUMPING EQUIPMENT, MISCELLANEOUS SUPPLIES:

Single and Double Eccentric Band Wheel Pumping Powers
Push and Pull Powers
Wire Line Pumping Outfits
Sucker Rods and Pull Rods
Working Barrels and Valves
Casing Heads
Pumping Jacks
Stuffing Boxes
Polished Rods
Engine Water Pumps
Barrett Type Oil Well Jacks
Well Packers
Belt Tighteners and Stretchers
Iron and Brass Cocks and Valves
Pipe Saddles
Pipe Vises
Fuel Oil Burners
Casing Tongs
Casing Wagons
Anchor and Casing Clamps
Fittings of all kinds, etc., etc.


PUMPING POWER


PUMPING POWER


TEMPER SCREW


STUFFING BOX

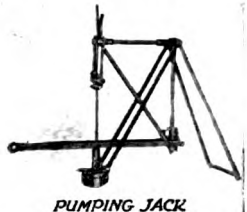

LOWER VALVE

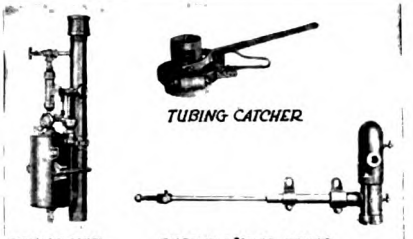

UPPER VALVE

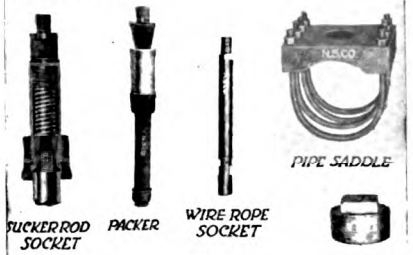

SINKER BAR


OIL SAVER


PIPE JARS

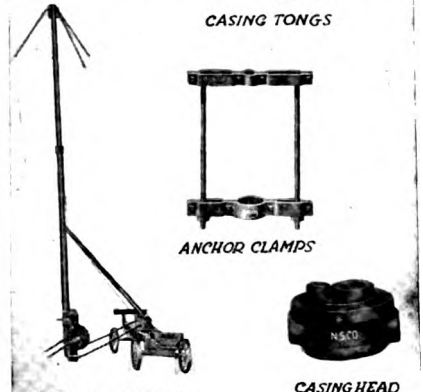

PUMPING JACK











Digitized by Google

THE BIGGS BOILER WORKS CO.

Established 1887

CASE AVE. & NEWTON ST., AKRON, OHIO

Manufacturers of Steel Storage and Pressure Tanks of Every Description, Vulcanizers, Devulcanizers, Rotary Bleaching Boilers, Steel Riveted Pipe, Light and Heavy Plate Construction

STEEL STORAGE TANKS:



We specialize in the construction of Pneumatic Water Supply Tanks, Extra Heavy Hot Water Storage Tanks with and without coils, and Air Receivers; this line of tanks being designed for operating pressures of 75 to 110 lbs. respectively, and are furnished in sizes from 117 gallons up to 9000 gallons.

650 The tanks are all shown on our Price List "F" which gives a complete description of the tanks together with weights, capacities, size and location of pipe flanges and list prices.

All steel used in the construction is soft open hearth steel; all rivets are hydraulically driven and tanks are tested to 150 lbs. pressure. We carry standard sizes in stock for immediate shipment.

Write for Price List and Discount Sheet.

OIL AND GASOLINE STORAGE TANKS:

We manufacture a complete line of Oil and Gasoline Storage Tanks in various capacities ranging from 84 gallons to 25,000 gallons capacity.

Our Price Lists No. 25 and No. 30 are complete in every detail showing several hundred tanks of various sizes, giving weights, thickness of material and list prices.

We use the Underwriters' Label Service and will attach Underwriters' Label to our tanks without extra charge. Our Lists cover both standard and extra heavy construction.

Standard sizes in stock for immediate shipment. *Write for Price Lists and Discount Sheets.*

HIGH PRESSURE TANKS:



The accompanying illustration shows a High Pressure Tank designed for 500 lbs. daily working pressure. The longitudinal seams are butt joint double covering strip, quadruple staggered riveted; circle seams are lap joint double staggered riveted. Thickness of material, 1¼" with rivets $1\frac{5}{16}$" diameter.

Our plant being hydraulically equipped throughout, we are prepared to fabricate the heaviest type of plate construction. All our heads are flanged and dished under hydraulic pressure of 300 tons, and our riveting equipment consists of six hydraulic riveters ranging in capacity from 33 tons to 150 tons pressure, the largest riveter being 18' 6" gap.

With such equipment we are in position to handle all types of steel tank and plate work such as Condensers, Evaporators, Filter Tanks, Surge Tanks, etc., etc.

VULCANIZERS:

We specialize in the construction of Vulcanizers and Devulcanizers for the rubber trade. *Complete catalogue upon request.*

PAPER MILL MACHINERY:

The Biggs Globe and Cylinder Rotary Bleaching Boilers are used in the majority of the strawboard and paper mills in the United States and Canada.

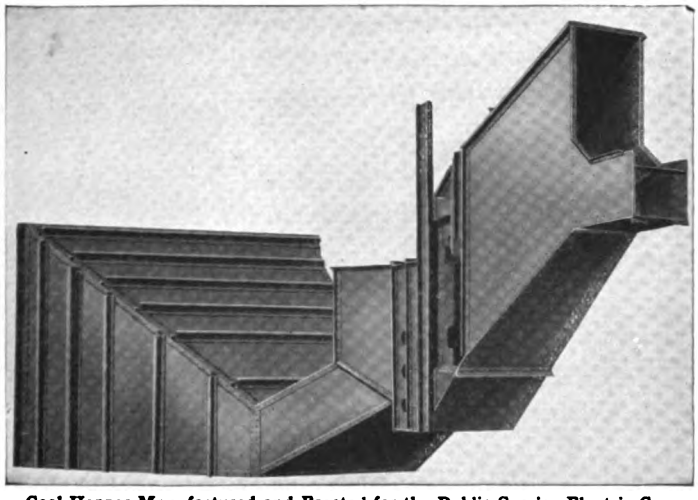
Digitized by Google

CONNERY & COMPANY, INC.

2ND AND LUZERNE STS., PHILADELPHIA, PA.

NEW YORK OFFICE, 52 Vanderbilt Ave.

Manufacturers and Erectors of Steel Plate Work of Every Description Including Steel Stacks, Stand Pipes, Boiler Breechings, Coal and Ash Hoppers, Tanks of Any Kind, Tar and Asphalt Kettles

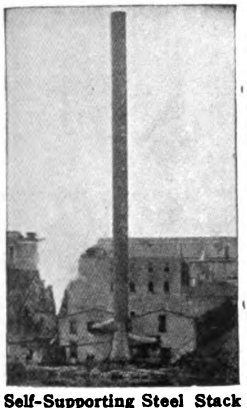


Coal Hopper Manufactured and Erected for the Public Service Electric Co., Newark, N. J. Heavy Plate Work ¼" to ⅜" Material

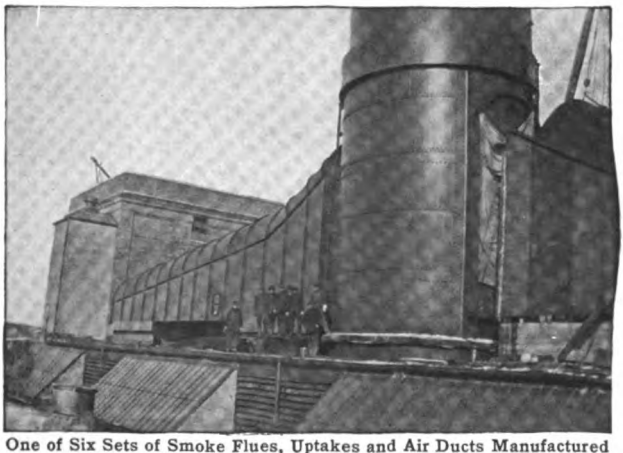
The reproductions shown while of a character familiar to all engineers and about which little or no information need be given, are typical of the general character and wide range of work handled by this company. We are equipped to fabricate and erect steel plate work of any description from $\frac{1}{16}$" to 1" in thickness.

Particular attention given to the most difficult construction.

Send us your plans and specifications for quotations or request for information and assistance in connection with work in our line.



Self-Supporting Steel Stack Manufactured and Erected for the Ehret Magnesia Mfg. Co., Port Kennedy, Pa.



One of Six Sets of Smoke Flues, Uptakes and Air Ducts Manufactured and Erected at Buffalo General Electric Co., Buffalo, N. Y. Stone & Webster, Inc., Engineers

Digitized by Google

FARRAR & TREFTS, INC.

ESTABLISHED 1864 INCORPORATED 1911

BUFFALO, N. Y.

Engineers, Iron Founders, Machinists, Boiler Makers, Tank Builders, Pattern Makers, Heavy Iron Castings, Steel Plate Work

STEEL PLATE WORK:

Boilers, Stacks, Tanks and other welded or riveted steel plate construction, flanged and dished heads.



Steam Chest

Our Tank and Boiler Shops are equipped with up-to-date tools and machinery suitable for carrying out the ideas of Engineers. Difficult plate and tube work carefully executed from your drawings and specifications. Special machinery built to order.

CHEMICAL APPARATUS:

Dryers, Stills, Evaporators, Kettles, Filter Presses, Vats, Mixers, Jacketed Tanks for steam, oil or water.

MACHINE WORK:

Patterns, Forgings, Blacksmithing and Welding, either Acetylene or Electric.

We will build from your designs.

CASTINGS:

Gray Iron, Semi-steel, Acid Resistant, Municipal and Grate Bars. Single castings from one pound to fifty tons for shipyards, railroads, engine builders and machinery manufacturers.



Caustic Pot



Valve Body

In connection with our modern Foundry we are prepared to furnish all material necessary for the completion of your work.

Heavy Iron Castings furnished from customers' patterns.

Capacity 150 tons per day. Single castings up to 50 tons.

Estimates furnished.

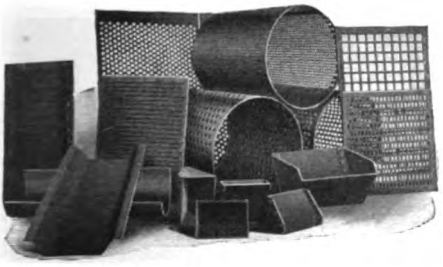
Digitized by Google

HENDRICK MANUFACTURING CO.

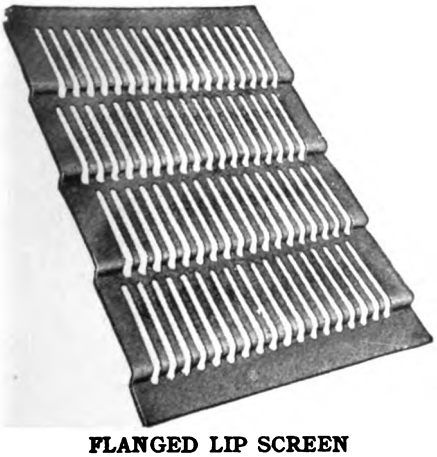
CARBONDALE, PENNA.

NEW YORK OFFICE: 30 CHURCH STREET
PITTSBURGH OFFICE: 915–916 UNION BANK BUILDING
HAZLETON, PA. OFFICE: 705 MARKLE BANK BUILDING

Manufacturers of Perforated Metal Screens, Elevator Buckets, Conveyor Flights and Trough, Stacks, Tanks, Hoppers, Elevator Casings, General Sheet and Light Structural Work



"HENDRICK" SCREENS for all purposes, in steel, manganese bronze and the various other metals. Round, square and slotted holes. We have dies for nearly every size required, and can make up tools for special needs.



FLANGED LIP SCREEN

THE PATENT FLANGED LIP SCREEN is manufactured exclusively by us. Used for screening coal and coke. This screen has many superior features, and the growing number of users is but another evidence of its efficiency. Detailed information is given in our Hand Book and we would be glad to supply further data upon request.

ELEVATOR BUCKETS (both plain and perforated), **CONVEYOR TROUGH AND FLIGHTS,** also **PANS** for Scraper and Apron Conveyors, Picking Tables and Loading Booms. Also other items for elevating and conveying equipment.

GENERAL SHEET AND LIGHT STRUCTURAL WORK such as Tanks, Hoppers, Coal and Ash Bunkers, Stacks, Smoke Flues, Elevator and Conveyor Casings, Screen Cases, Chutes and Loading Booms for Tipples, Steel Truck Bodies, Mine Cars, Mine Car Parts, Coal and Ash Conveying Lines, Heavy Buckets for the handling of ore and other materials also General Sheet and Plate Pipe Construction.

The Hendrick PERFORATED METAL Handbook contains valuable information, especially for the user of screens and engineers. We would be pleased to mail you copy.

We would be pleased to receive your orders or inquiries.

SEE OUR ADVT. IN MECHANICAL ENGINEERING THE JOURNAL OF THE A.S.M.E.

Digitized by Google

THE JOS. HONHORST COMPANY

1016-20 WEST SIXTH STREET, CINCINNATI, OHIO

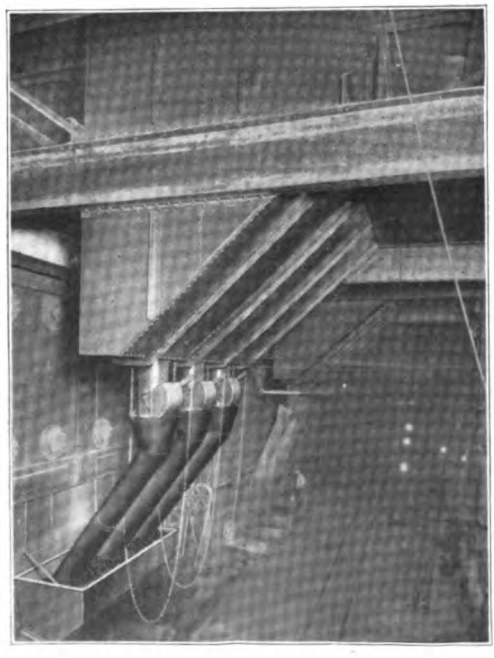
Sheet Steel Work

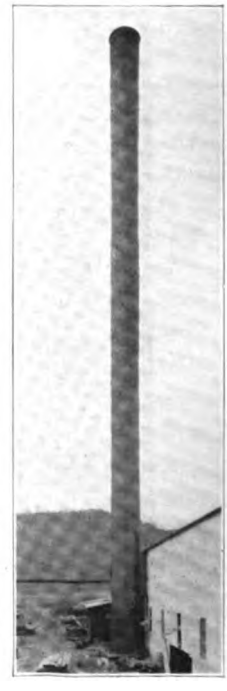




Manufacturers of Steel Tanks, Coal and Ash Hoppers, Elevator Casings, Smokestacks, Boiler Breechings, Lathe Pans, Tar and Asphalt Kettles, Surface Condensers, Weighing Hoppers, Gas Conduits, Factory Trucks, and any kind of sheet steel work from $\frac{1}{16}$″ to $\frac{5}{16}$″ in thickness, either riveted or welded.

Estimates or any information concerning work furnished promptly.





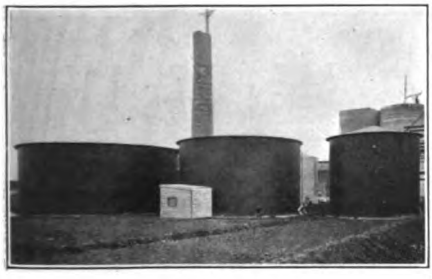
Digitized by Google

THE LASKER IRON WORKS

3201 SOUTH LINCOLN STREET, CHICAGO, ILL.

Telephone McKINLEY 3700

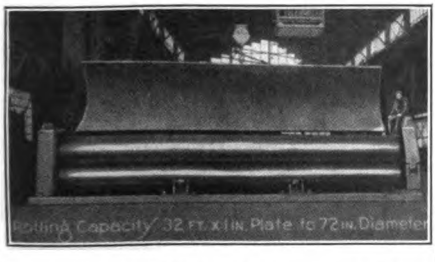
Engineers—Fabrication—Erectors
Steel Plate Construction



Storage Tanks



Gasoline Stills



Rolling Capacity 32′–0″, 1″ Plate to 72″ Diam.

BUILDERS OF STANDARD STEEL PRODUCTS:

Lasker products are based on twenty years' intensive experience, plus modern equipment. On this firm foundation we have built our name and reputation. The maintenance of these things necessitates that they be protected and extended with every order filled.

Customers are saved annoyance, delays, worry and money through this source. It means that the installation of the sturdy, economical Lasker Steel Products brings results in service, economy and satisfaction.

LASKER SERVICE:

655

We are prepared to erect special steel plate work of any kind wherever you may be located.

As engineers, fabricators, and erectors, we specialize in steel plate construction for smelters, steel rolling mills, and oil refinery equipment. Also hydraulic power plants, acid and chemical plants, packing houses, soap works, power plants and the making of tanks for any storage use.

The scope of our operations on work of this nature, covering as they do practically the whole United States, makes our service available to concerns everywhere who appreciate quality. Large stocks permit prompt action.

PRICES ON REQUEST:

On receipt of specification, covering your needs, we will immediately prepare and submit quotation which will prove the economy of Lasker methods and efficiency.

Digitized by Google

LANCASTER IRON WORKS, INC.

Incorporated 1910

LANCASTER, PA.

NEW YORK OFFICE: 501 FIFTH AVE.

Manufacturers of Tanks and Steel Plate Construction

PRODUCTS:

Steel Plate Products

Tanks

Acid	Jacketed
Air	Knocked-down
Blow-off	Mixing
Car	Molasses
Chemical	Oil Storage
Condenser	Pressure
Dipping	Rectangular
Expansion	Rendering
Filtering	Settling
Field Storage	Soap Factory
Galvanizing	Storage
Gasoline	Tar
Grain	Turpentine
Hot-Water	Vacuum
Hydro-Pneumatic	Varnish

656

Chemical Apparatus and Special Machinery

Accumulators	Kilns
Acid Eggs	Nitrators
Agitators	Purifiers
Autoclaves	Reducers
Benzol Washers	Retorts
Condensers	Rotary Dryers
Cooling Towers	Rotary Filters
Crystallizers	Stills
Digestors	Sulphonators
Evaporators	Vats
Fusion Pots	Vulcanizers
Kettles	Washers

Pipe

Straight Riveted Pipe
(for any purpose or pressure)
Hydraulic Mains
Land Pipe (for dredging)
Pontoon Pipe (for dredging)
Steel Pontoons
Dredge Pipe Accessories
Ball Joints, Gate Valves, Y's, etc.

Stacks and Breechings
Field Storage Tanks
All kinds of Steel Plate Work
Built and Erected by Our Own Crews.

LANCASTER ERECTING CREWS:

We have our own experienced erecting crews out from Maine to Florida. These crews are an integral part of our organization. Their work is guaranteed by us and we accept the full responsibility.

Our policy is one of square dealing and our customers are fully protected by our guarantee that every job we undertake must be completed to the entire satisfaction of the purchaser.

ORGANIZATION:

The organization a purchaser of Lancaster equipment must look to is made up of men whose qualifications have stamped them as the best for their individual places in our plant. Every effort is made to co-operate to the fullest possible extent with each customer. Our engineers are at their disposal and may be called upon at any time for their expert advice.

This organization can build anything in the way of steel plate equipment.

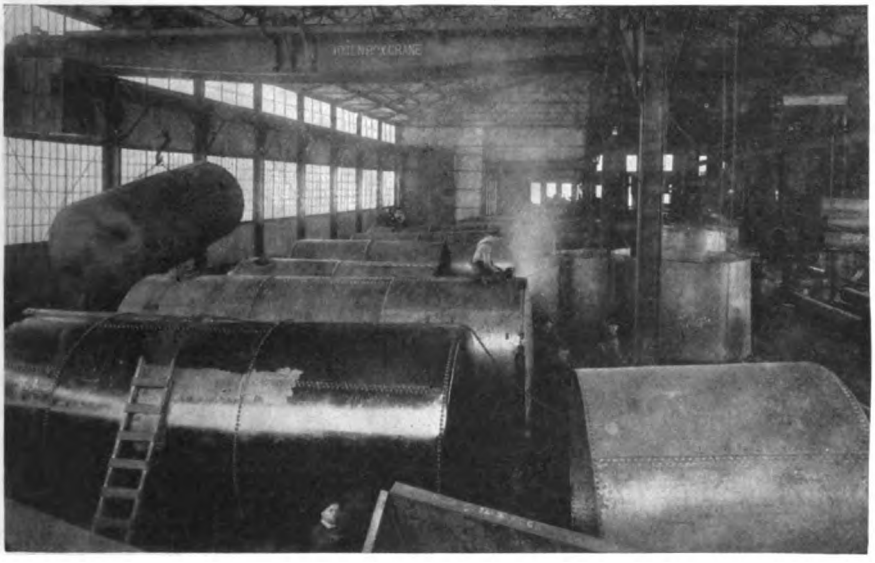
SHOPS:

Plate	Machine
Pattern	Foundry

The Lancaster Plant is composed of the above four units. This is an unusual combination and permits us to take any Steel Plate Construction order and do all the work in our own shops. In this way

Digitized by Google

LANCASTER IRON WORKS, INC. LANCASTER, PA.



Testing and Loading Bay

we know the work is done right as we control all the factors which affect production. It means that your order will not be split up and parceled out to three or four different concerns. We are equipped to turn out 25,000 tons of fabricated steel plate work per year.

RESOURCES—RESPONSIBILITY:

Today, when big work is to be given out, Engineers and Purchasing Departments scrutinize first the responsibility of the concerns bidding, and secondly the price. A bid too low carries its own danger signal.

The financial standing of the Lancaster Iron Works is such that we are able to handle any size undertaking. Our equipment and location enable us to turn out and deliver work promptly and satisfactorily.

LANCASTER SERVICE:

The Lancaster Iron Works puts at the disposal of every customer and prospective customer a trained and experienced Engineering staff skilled in the design and construction of steel plate work. The cumulative experience gained by the men of our organization through their years of experience is built into every piece of Lancaster equipment and is at the disposal of any one calling upon us.

Digitized by Google

MORRISON BROS.

ESTABLISHED 1855

DUBUQUE, IOWA

Manufacturers of Steel Tanks and Brass and Steel Oil Equipment

Sixty-Six Years of Success in the Manufacture of Steel Tanks Guarantees the Quality of All Morrison Products.

Hydro-Pneumatic Pressure Tanks, Hot Water Storage Tanks, Air Receivers:

Experience having proved the superiority of riveted and brazed tanks this process is used by Morrison Bros. in the construction of all tanks which are to be subjected to internal pressure. For Morrison brazing, a copper compound is used.

Oil Tanks for Motor Trucks and Wagons:

The feature which distinguishes Morrison built Oil Tanks for use on trucks or wagons is that each complete unit is composed of two or more separable compartments.

Underground Storage Tanks:

The same quality of workmanship and material which gives strength to Morrison water, air and oil tanks, characterizes their underground tanks which are built from heavy plate and welded. Each of the underground Morrison tanks bears the label of the Underwriters.

Morrison Self-Closing Tank Faucets:

The Morrison principle of self-closing faucets lessens the danger of fire, provides against theft and permits the fast flow of oil.

Tank Wagon Air Vents:

Morrison Double Acting Air Vents are equipped with ball valves and automatically allow air to enter the tank or pressure to be released as desired. On truck tanks so equipped the vent is automatically closed, thus preventing leakage if the tank should be overturned.

Station Tank Air Vents:

As large air vents are required on Station Oil Tanks to admit free passage of air when drawing off or filling, the task is made easier through the use of the Morrison Brass Vents which work automatically and easily.

Automatic Barrel Fillers:

A float valve which closes automatically when the barrel is filled to the desired point is the feature which gives much satisfaction in Morrison Automatic Barrel Fillers.

Relief Valves:

All valves manufactured at the Morrison factory are made throughout of brass and each is equipped with a method of adjustment to maintain the pressure desired. The valves are also provided with a lever to permit of their being tested every day.

Special Tanks:

The Morrison Construction Staff is competent, through experience and study, to build any sort of tank desired.

Tank and Brass Catalogues:

Catalogues, giving in detail the features of Morrison construction in tanks and in brass oil equipment, together with prices, will be mailed upon request.

Digitized by Google

NEW YORK CENTRAL IRON WORKS CO., INC.

NORTH MIDDLEBURG ROAD
HAGERSTOWN, MARYLAND

Builders of Tanks, Stacks and General Steel Plate Construction



Special Still Built for Refining of Gasoline

PRODUCTS:

We build a variety of steel plate work ranging from simple welded or riveted construction, such as pipe and bins, to special tanks and agitators and other chemical, oil and gas equipment.

To the chemical and allied industries particularly, we offer ability to economically build from your most difficult specifications or cooperate with you in planning work on the most efficient yet practical basis.

FACILITIES:

Our lagre plant offers modern equipment for all classes of plate construction and our new machine shop is able to turn out all various machined parts to complete special agitators, churns and similar apparatus.

SHIPPING:

Plant is located in Hagerstown, Maryland, on the main line of the Pennsylvania System with direct connection with the Norfolk and Western, Western Maryland and Baltimore and Ohio.

PRICES:

Send us your specifications or ask the cooperation of our Engineering depart ment in preparing your designs.



Seal Pot Built for Benzol Plant

Digitized by Google

WM. B. SCAIFE & SONS CO.

Founded 1802

OAKMONT, PA.

PITTSBURGH OFFICE
First Nat'l Bank Bldg.

NEW YORK OFFICE
26 Cortlandt St.

CHICAGO OFFICE
First Nat'l Bank Bldg.

Manufacturers of Scaife Copper-Brazed Pressure Tanks

BRAZED TANKS:

These tanks can be furnished of any diameter between 6″ and 48″, with one or both heads concave or convex.



Plate H-8

Our exclusive process of copper-brazing the seams or joints makes these parts actually stronger than the remainder of the tanks. The brazing material so thoroughly unites itself with the steel, filling the minute interstices, that the tank has the strength of one continuous piece of metal. This copper-brazing process has been used by us exclusively for nearly fifty years. We positively guarantee these tanks to hold air indefinitely without loss of pressure.

Plates H-3 and H-4 are taken from actual photographs of a copper-brazed tank which we purposely tested to destruction. Notice the distorted shape of the bursted tank and the splendid condition of all the brazed parts proving conclusively that they are stronger than the original material.



Plate H-9

This tank was 12″ diameter, shell $\frac{7}{64}$″, head $\frac{3}{16}$″; tensile strength of the steel, about 58,000 lbs. The tear in the shell occurred when the applied pressure reached 1,035 lbs. per sq. in.; all the brazed joints remaining intact.

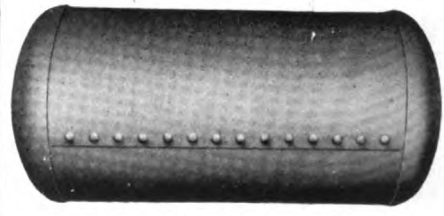


Plate H-3

Similar tests have been made frequently by entirely disinterested tank experts with the same results as in this case.

No other manufacturer furnishes copper brazed tanks, although occasional attempts are made to create this impression in the public mind. Soft-soldering

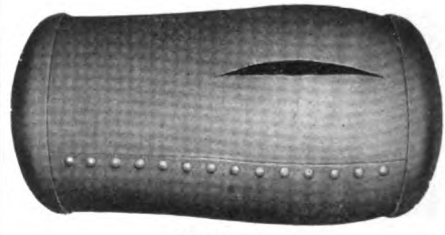


Plate H-4

and other so-called "brazing" methods must not be mistaken for copper-brazing. Hundreds of our brazed tanks made over twenty years ago are still in service. The copper coating around the seams protects these parts from corrosion.

Brazed Pressure Tanks for All Purposes.

Also Welded or Riveted Tanks, Plain or Galvanized, for All Purposes.

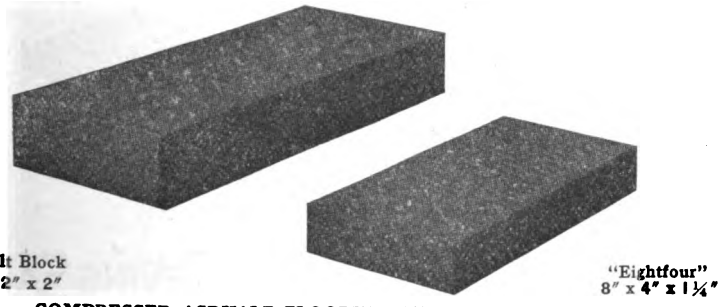
(See page 143 for additional products of this Company)

Digitized by Google

THE HASTINGS PAVEMENT CO.

EXECUTIVE OFFICES: 25 BROAD STREET, NEW YORK
PLANT: HASTINGS-ON-HUDSON, N. Y.

Manufacturers of Compressed Asphalt Flooring and Paving Blocks and Tiles



COMPRESSED ASPHALT FLOORING AND PAVING BLOCKS

ASPHALT BLOCKS:

A scientifically manufactured material for the wearing surface of streets and roads, and of piers, warehouses, loading platforms, bridges, factory floors, driveways, courtyards, etc.

Manufactured at a large permanent plant; shipped in block form ready to lay; and always obtainable in any quantity for extension and repairs.

COMPOSITION:

A properly proportioned mixture of natural asphalt, crushed rock and limestone dust is heated to 300 degrees Fahr., and shaped into uniform blocks under a pressure of 6000 lbs. for sq. in.

SIZE AND WEIGHT:

Width In.	Length In.	Depth In.	Weight Lbs.	
5	12	2	11	
5	12	2½	13½	
4	8	1¼	3½	("Eightfours")

A square foot of 2-in. blocks weighs 26 lbs.

A square foot of 1¼-in. "Eightfours" weighs 15½ lbs.

The specific gravity of Asphalt Block is 2.40.

"EIGHTFOUR:"

The "Eightfour" Asphalt Flooring Block is designed especially to meet those conditions in which weight and thickness of flooring must be at a minimum consistent with durability under heavy traffic. The "Eightfour" is also suitable for roofs subject to traffic.

ADVANTAGES:

Asphalt Blocks are pleasing in appearance, smooth, noiseless, dustless, warm and easy under foot, sanitary because non-absorbent, and next to granite the most durable. They present a gritty, non-slippery, non-skidable surface and are easily taken up and relaid. They are non-expansive, odorless and free from exudations, and are not affected by standing loads, extremes of temperature, or by automobile oils. They are reasonable in cost, and are made to suit any climate and traffic conditions.

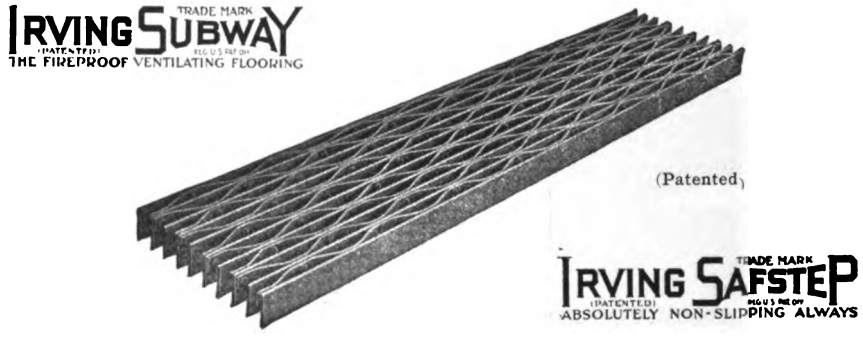
METHOD OF LAYING:

Upon the surface of the concrete foundation there is spread a bed of portland cement mortar, ½ in. thick, which is struck to a true and even surface. Upon this bed the blocks are immediately laid, with close joints and uniform top surface, the joints being broken 4 in. After being laid, the blocks are given a light coat of sharp, fine sand, well broomed into the joints. The joints of the "Eightfours" are grouted. Traffic is permitted in 4 or 5 days.

Digitized by Google

IRVING IRON WORKS COMPANY

THIRD STREET AND DUTCHKILL CREEK
LONG ISLAND CITY, NEW YORK, U. S. A.
Telephone, Hunters Point 3342



PRODUCTS:

Sole manufacturers of Irving "Subway," the fireproof ventilating grating-flooring; Irving "Safstep," the non-slipping safety stair or ladder step; "Reticuline," "Eggcrate" and "Honeycomb" grating-flooring; other forms of grating-flooring and related products; metal accessories for power plants, lighting plants, dyehouses, chemical plants, industrial plants, steamships; sidewalk doors, elevator gratings.

662

TRADE MARKS:

The trade marks "Subway," "Reticuline," "Sunway" and "Safstep" are registered in the U. S. Patent Office, are the exclusive property of the Company, and cannot be legally used in connection with any grating-flooring products of any other manufacturer.

SCOPE OF USE:

Irving "Subway" is a perfect fireproof ventilating flooring or grating-flooring, the exclusive advantages of which recommend it preëminently for such purposes as are here suggested in all of which actual service has proved its superlative merit.

Power plant floors, galleries, walkways and stairs.

Turbine pits — Pump platforms
Pipe trenches and sump covers
Floors and walkways — Gas-house floors
Retort houses — Charging floors
Still houses — Register openings
Replacing water-cooled plates
Elevator and hatchway gratings
Ventilation shaft covers
Stair and ladder steps
Drying oven floors — Window guards

Surface armoring or protection for concrete floors and platforms.

ADVANTAGES:

Irving "Subway," load for load and span for span, is the lightest grating-flooring made, and provides the maximum strength with the minimum addition to dead loads. Its construction gives a complete distribution of load over the full panel area.

Its surface is absolutely non-slipping under all conditions, and is safe and comfortable to walk, work or wheel upon. Wheeled trucks or rib-hooped barrels can be rolled over it in any direction without spreading the bars or going through.

It gives the maximum lighting and ventilation area, yet its individual openings are so small that only the smallest objects can pass through.

Its construction is strong, rigid and permanent. It cannot become loose and "rattley." Its appearance harmonizes with any surroundings.

Ordinary holes for pipes, columns, etc., can be cut out without additional framing or it can be built to fit irregular spaces. The structure of the flooring gives sufficient strength to carry the load.

IRVING ENGINEERING SERVICE:

The Company's wide experience in applying Irving "Subway" for all purposes is available to all interested, without charge or obligation. Estimates will be furnished promptly, on receipt of rough sketch of lay-out, with spans and loads.

CATALOGUE:

Catalogue 3A3, sent on request, gives complete description of Irving "Subway" grating-flooring and "Safstep" stair or ladder steps, with specifications, tests, and loads and deflections for all standard sections.

Digitized by Google

SILUMITE PRODUCTS CORPORATION

EXECUTIVE OFFICE
1410 MORRIS BUILDING, PHILADELPHIA, PA.
WORKS: CLIFTON, DELAWARE COUNTY, PA.
SALES OFFICES
NEW YORK
253 West 58th Street
BROOKLYN, N. Y.
23 Flatbush Ave.

Manufacturers of Silumite Paint for Iron and Steel

SILUMITE:

A real protective paint which *protects* iron and steel as it has never been protected before.

Not alone is it protective against the elements but in addition is—

Non-corrosive
Heat Resisting
Acid Resisting
Alkali Resisting

No special surface preparatory treatment or special apparatus required for its application. Flows easily from the brush or may be used in a spray without trouble from clogging.

An unusual paint for unusual conditions; where other paints peal off, crack and disintegrate in a few weeks, Silumite has been in service for periods exceeding a year and is still perfect.

In the Oil Refining Industry, Silumite has established an unprecedented record and it is almost needless to add that conditions met with in this field are of the utmost severity, so much so, that before the use of Silumite it was necessary to repaint some apparatus every two weeks.



663

Silumite will be found especially efficient in the protection of

Under Side of Agitator Roofs
Smoke Stacks
Steel Freight Cars
Structural Steel Generally
Gas Holders
Locomotive Head Ends
Purifiers
Oil Tanks
Galvanized Iron
Automobile Exhaust Pipes

Consult us before outlining your paint specifications.

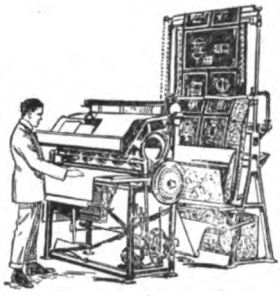
Digitized by Google

THE C. F. PEASE COMPANY

843 No. FRANKLIN ST., CHICAGO

Continuous Blue Printing, Washing and Drying Equipment; Vertical Blue Printing Equipment and Sheet Washer; Drawing Instruments; Drawing Tables and Boards; Draftsmen's Stools; Tracing Paper and Cloth; Blue Print Paper; Filing Cabinets; Drafting Room Supplies; Surveyors' Instruments

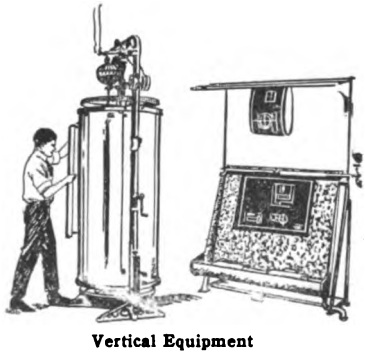
BLUE PRINTING EQUIPMENT:



Automatic Equipment

One hundred yards of perfect blue prints can be produced every hour of the day or night by one boy and a Pease Peerless Automatic-Continuous Blue Printing Equipment. This drafting room labor-saving equipment automatically prints, washes and dries at a lower cost per square foot of finished blue print than is possible by any other method. Short runs of five or ten minutes are just as economically done by an operator who has other duties.

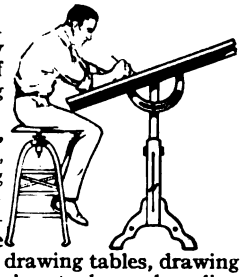
664



Vertical Equipment

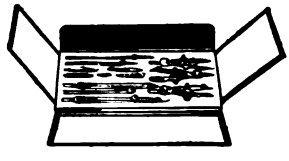
When blue printing requirements do not necessitate the installation of the automatic equipment, a Pease Vertical Blue Printing Machine and Sheet Washer, installed in a corner of the drafting room, will furnish a constant supply of perfect blue or negative prints of moderate size. The vertical equipment is made in five sizes, moderately priced. Descriptive booklets describing the Peerless Automatic Equipment and the Pease Vertical Blue Printing Machine will be sent at your request.

DRAFTING ROOM FURNITURE:



Catalog F-21 contains many illustrations of modern drafting room furniture Steel and wood, horizontal drawer, sectional filing cabinets; a vertical steel plan-safe for blue prints, maps, etc.; drawing tables, drawing boards, draftsmen's stools and ruling attachments are a few of the many pieces shown. If you are contemplating the purchase of drafting tables or stools, you will be interested in the complete assortments illustrated. We will gladly send you a copy of this catalog for your files on request.

DRAWING INSTRUMENTS:



Accuracy, finish and quality are built into Pease "Chicago Made" Drawing Instruments by skilled workmen from carefully selected material. Their excellent construction and refinement of design make them superior to any line of drawing instruments, either domestic or imported. Our new Catalog D-21 contains prices and description of complete sets in genuine morocco pocket style cases, and of separate instruments. Write for a copy.

Digitized by Google

Mechanical Equipment Directory

IN this, its sixth issue as a reference feature of the volume of A. S. M. E. CONDENSED CATALOGUES, the general Mechanical Equipment Directory shows a further gain in scope and comprehensiveness.

Wherever the omission of appropriate subject headings has been noted in this office, or called to the attention of the Society by members or others, these have been added. At the same time every effort has been made to secure and include the names of the greatest possible number of eligible manufacturers, with the result that in this volume the Directory contains the names and addresses of more than 4000 firms, listed under upward of 3000 classifications of equipment.

Owing to the considerable extra cost of compiling and publishing the Directory, it was found necessary, as in the previous issues, to limit the free listings for non-space users to three subject headings for each firm, additional listings being procurable at the rate of three dollars each. Firms using space for publication of their data in the Catalogue Section of the volume are entitled to full listing of their products in the Directory without additional charge, with the firm name printed in capital type and followed by the page numbers of their Catalogue data.

The Mechanical Equipment Directory is especially designed to meet the ready reference needs of mechanical engineers and others requiring a highly specialized list of this description. It is believed that the Directory will prove invaluable for this purpose, and also as a guide to and background for the more detailed information presented in the Catalogue Section of the volume.

See next page for directions

DIRECTORY SECTION

PART I **Pages 665-899**

Digitized by Google

Directions For Using Directory

Basis of Classification

In general, the policy followed is to index equipment under its most common and accepted name, using the main noun as the key index word. On that basis such equipment as Steam Engines, Oil Engines, etc., will be found indexed as ENGINES—Steam, ENGINES—Oil, etc. Exceptions to this arrangement occur where equipment, by usage or association, is best described by a complete phrase. These will be found indexed under the first word of the group. Examples of equipment listed in this manner are, DRILL HEADS, OIL CUPS and all Apparatus, Outfits, Machines, Machinery, Systems, etc.

Cross Reference

In cases where the equipment is equally well known under two names, or where it has been deemed advisable, firms making such equipment have all been listed under one subject heading and a cross reference inserted under the other heading or headings. Amplifying this system, various class or group names have been inserted, giving directions to see specific headings under which that equipment can be found. For example, under APPARATUS, directions are given to see "Acetylene," "Gas Analysis," etc., and under MACHINES to see "Drilling," "Grinding," "Slitting," etc.

Trade Names

As an additional aid in locating particular equipment, trade names have been included. These will be found following immediately after the firm name and are enclosed in quotation marks and parenthesis, thus ("Acme").

Catalogue Index

The recommendation is earnestly made that the Directory be used in conjunction with the Catalogue pages, as much valuable information can be found concerning products if reference is made to the pages whose numbers are given after the firm names.

Digitized by Google

MECHANICAL EQUIPMENT DIRECTORY

ABRASIVE MATERIALS
Abrasive Co., Bridesburg, Philadelphia, Pa.
Carborunum Co., Niagara Falls, N. Y.
Clover Mfg. Co., Norwalk, Conn.
General Abrasive Co., Niagara Falls, N. Y.
Hampden Corundum Wheel Co., Brightwood, Mass.
Manning Abrasive Co. (Inc.), Troy, N. Y.
Maxf Grinding Wheel Corp'n., Chester, Mass.
NORTON CO., Worcester, Mass...*pp. 489, 510.*
STERLING GRINDING WHEEL CO., Tiffin, Ohio...*p. 511*
White Heat Products Co., West Chester, Pa.

ABRASIVE WHEELS
(See Grinding Wheels)

ABSORPTION APPARATUS
HOPE ENGINEERING & SUPPLY CO., Mt Vernon, Ohio...*p. 49*

ACCUMULATORS, HYDRAULIC
Aldrich Pump Co., Allentown, Pa.
BUCKEYE IRON & BRASS WORKS, Dayton, Ohio...*p. 168*
BURROUGHS, CHARLES CO., (The) Newark, N. J...*p. 590*
Dunning & Boschert Press Co. (Inc.), 329 W. Water St., Syracuse, N. Y.
ELMES, CHAS. F. ENGINEERING WORKS. 215 N. Morgan St., Chicago, Ill...*p. 591*
FULTON IRON WORKS CO., St. Louis, Mo...*p. 37*
GALLAND-HENNING MFG. CO., Milwaukee, Wis...*p. 592*
HYDRAULIC PRESS MFG. CO. (The), Mount Gilead, Ohio...*p. 593*
METALWOOD MFG. CO., Detroit, Mich...*p. 594*
Perrin, William R. & Co., Room 504, 343 So. Dearborn St., Chicago, Ill.
ROBERTSON, JOHN & CO., 133 Water St., Brooklyn, N. Y...*p. 595*
*U. S. CAST IRON PIPE & FOUNDRY CO., Burlington, N. J...*pp. 232, 233*
WATSON-STILLMAN CO., 35 Church St., New York, N. Y...*p. 596*
WOOD, R. D. & CO., Philadelphia, Pa...*p. 597*

ACETYLENE APPARATUS
BASTIAN-BLESSING CO., 125 W. Austin Ave., Chicago, Ill...*p. 539*
Carbic Mfg. Co., Duluth, Minn.
CASH, A. W. CO., Decatur, Ill...*p. 205*
Davis-Bournonville Co., Jersey City, N. J.
Modern Engineering Co., 23rd & Walnut Sts., St. Louis, Mo.
Weldcraft Equipment Co., 2501 Penn Ave., Pittsburgh, Pa.

ACETYLENE GAS
Air Reduction Co. (Inc.), 342 Madison Ave., New York, N. Y.
Prest-O-Lite Company, Inc., 30 E. 42nd St., New York, N. Y.

ACETYLENE LIGHTS (Portable)
MILBURN, ALEXANDER CO. (The), Baltimore, Md...*p. 540*

ACID CONTROL SYSTEMS
Crandon Mfg. Co., 105 Middle St., Portland, Me.

AERIAL TRAMWAYS
(See Tramways, Wire Rope)

AFTERCOOLERS (Air)
CHICAGO PNEUMATIC TOOL CO., 6 E 44th St., New York, N. Y...*p. 548*
*INGERSOLL-RAND CO., 11 Broadway, New York, N. Y...*pp. 546, 547*
*SCHUTTE & KOERTING CO., 1184 Thompson St., Philadelphia, Pa...*p. 159*

AGITATORS
*BROWN, A. & F. CO., 79 Barclay St., New York, N. Y...*p. 303*
*CALDWELL, W. E. CO., 340 E. Brandeis St., Louisville, Ky...*p. 323*
Dorr Co., Inc., 101 Park Ave., New York, N. Y.
*HILL CLUTCH CO., Cleveland, Ohio...*p. 331*
LASKER IRON WORKS, 3201 So. Lincoln St., Chicago, Ill...*p. 655*
NEW YORK CENTRAL IRON WORKS CO. (Inc.), North Middleburg Road, Hagerstown, Md...*p. 659*
*SCHUTTE & KOERTING CO., 1184 Thompson St., Philaelphia, Pa...*p. 159*
*U. S. CAST IRON PIPE & FOUNDRY CO., Burlington, N. J...*pp. 232, 233*
Warren City Tank & Boiler Co., Warren, O.
—**Steam Jacketed**
*DE LA VERGNE MACHINE CO., 1123 E. 138th Street, New York, N. Y...*p. 40*
KOVEN, L. O. & BROTHER, 154 Ogden Ave., Jersey City, N. J...*p. 605*
MILWAUKEE RELIANCE BOILER WORKS, Milwaukee, Wis...*p. 148*

AGRICULTURAL MACHINERY
Ann Arbor Machine Co., Ann Arbor, Mich.
Associated Manufacturers Co., Waterloo, Ia.
Case, J. I. Threshing Machine Co., Racine, Wis.
Castle, A. M. Engineering Co., Inc., La Crosse, Wis.
Gale Mfg. Co., Albion, Mich.
Holt Mfg. Co., Peoria, Ill.
International Harvester Co. of America, 606 S. Michigan Ave., Chicago, Ill.
Russell & Co., Massillon, O.

AIR BRAKES, COMPRESSORS, SEPARATORS, ETC.
(See Brakes, Compressors, Separators, Etc., Air)

AIR COMPRESSOR OUTFITS
*ALLIS-CHALMERS MFG. CO., Milwaukee, Wis...*pp. 28, 29*
*GENERAL ELECTRIC CO., Schenectady, N. Y...*pp. 18, 19, 20, 21*
Hercules Float Works ("Hercules"), 200 Franklin St., Springfield, Mass.
*INGERSOLL-RAND CO., 11 Broadway, New York, N. Y...*pp. 546, 547*
*NOVO ENGINE CO., Lansing, Mich...*pp. 586, 587*
Schramm, Chris D. & Son, Inc., West Chester, Pa.
*WORTHINGTON PUMP & MACHINERY CORPN., 115 Broadway, New York, N. Y...*pp. 44, 45, 46, 47*

AIR CONDITIONING APPARATUS
*AMERICAN BLOWER CO., Detroit, Mich...*p. 553*
ATMOSPHERIC CONDITIONING CORPN., 435 Chestnut St., Philadelphia, Pa...*p. 617*
Bahnson Co., Winston-Salem, N. C.
Bahnson Humidifier Co., Winston-Salem, N. C.
Carrier Air Conditioning Co., Buffalo, N. Y.
*CARRIER ENGINEERING CORPN., 39 Cortlandt St., New York, N. Y...*p. 620*
CLARAGE FAN CO., Kalamazoo, Mich...*pp. 556, 557*

Digitized by Google

DRYING SYSTEMS (INC.), 11 S. Desplaines St., Chicago, Ill...*pp. 618, 619*
Goron Engineering Corpn., 39 Cortlandt St., New York.
Lynn Air Conditioning Co., 103 Park Ave., New York, N. Y.
NEW YORK BLOWER CO. ("Peerless"). Chicago, Ill...*p. 555*
Wittenmeier Machinery Co., 852 N. Spaulding Ave., Chicago, Ill.

AIR FILTERING APPARATUS
Holly Pneumatic Systems (Inc.), 145 West 45th St., New York City.

AIR LIFT PUMPING SYSTEMS
Indiana Air Pump Co., 812 K. of P. Bldg., Indianapolis, Ind.
*INGERSOLL-RAND CO., 11 Broadway, New York, N. Y...*pp. 546, 547*
SULLIVAN MACHINERY CO., 120 S Michigan Ave., Chicago, Ill...*p. 549*

AIR TANKS AND CYLINDERS
(See Receivers, Air)

AIR WASHERS
*AMERICAN BLOWER CO., Detroit, Mich...*p. 553*
ATMOSPHERIC CONDITIONING CORPN. 435 Chestnut St., Philadelphia, Pa...*p. 617*
Buffalo Forge Co., 490 Broadway, Buffalo, N. Y.
Carrier Air Conditioning Co., Buffalo, N. Y
*CARRIER ENGINEERING CORPN., 39 Cortlandt St., New York, N. Y...*p. 620*
CLARAGE FAN CO., Kalamazoo, Mich...*pp. 556, 557*
*COOLING TOWER CO. (Inc.), 15 John St., New York, N. Y...*p. 165*
Ideal Heating Co., 915 Gates Ave., Brooklyn, N. Y.
KOVEN, L. O. & BROTHER, 154 Ogden Ave., Jersey City, N. J...*p. 605*
Lynn Air Conditioning Co., 103 Park Ave., New York, N. Y.
NEW YORK BLOWER CO. ("Peerless"). Chicago, Ill...*p. 555*
*SPRAY ENGINEERING CO. ("Spraco"). 60 High St., Boston, Mass...*pp. 166, 167*
STURTEVANT, B. F. CO., Hyde Park, Boston, Mass...*p. 106*

ALARM WATER COLUMNS
(See Water Columns, Alarm)

ALLEVIATORS, HYDRAULIC
ELMES, CHAS. F. ENGINEERING WORKS, 215 N. Morgan St., Chicago, Ill...*p. 591*

ALLOYS
AMERICAN BRASS CO., Waterbury, Conn...*p. 414*
Bario Metal Corpn., 167 W. 18th St., New York, N. Y.
Driver-Harris Co., Harrison, N. J.
Magnolia Metal Co., 113-115 Bank St., New York.
Metal & Thermit Corpn., 120 Broadway, New York.
Pittsburgh White Metal Co., 160 Leroy St., New York, N. Y.

—Aluminum
Premium Metal & Packing Co. ("Alumaloy"), Wilkinsburg, Pittsburgh, Pa.

—Non-ferrous
Alloy Foundry and Machine Corpn., New Rochelle, N. Y.
AMERICAN BRASS CO., Waterbury, Conn...*p. 414*
LUMEN BEARING CO., Buffalo, N. Y...*p. 416*
Pittsburgh White Metal Co., 160 Leroy St., New York, N. Y.

—White Metal
Riverside Metal Refining Co., Connellsville, Pa.

ALTERNATORS
(See Generators, Electric)

ALUMINUM
Alloy Foundry and Machine Corpn., New Rochelle, N. Y.
Aluminum Company of America, Pittsburgh, Pa.
United Smelting and Aluminum Co. (Inc.), New Haven, Conn.

AMMETERS
BIDDLE, JAMES G., 1211-1213 Arch St., Philadelphia, Pa...*p. 298*
*BRISTOL CO., Waterbury Conn...*p. 291*
*GENERAL ELECTRIC CO., Schenectady, N. Y...*pp. 18, 19, 20, 21*
Hickok Electrical Instrument Co., 10514 Dupont Ave., Cleveland, O.
Jewell Electrical Instrument Co., 1650 Walnut St., Chicago, Ill.
National Gauge & Equipment Co., 53 E. 42nd Street, New York, N. Y.
Pignolet, Louis M., 78 Cortlandt St., New York
*WESTINGHOUSE ELECTRIC & MFG. CO., East Pittsburgh, Pa...*pp. 176, 177*

AMMONIA
*DE LA VERGNE MACHINE CO., 1123 E. 138th St., New York, N. Y...*p. 40*
Herf & Frerichs Chemical Co., 929 Pierce Bldg., St. Louis, Mo.
National Ammonia Co., St. Louis, Mo.

AMMONIA CONDENSERS, FITTINGS, ETC.
(See Condensers, Fittings, Etc., Ammonia)

ANCHORS

—Expansion
DIAMOND EXPANSION BOLT CO. ("Diamond N. Y."), 90 West St., Cor. Cedar, New York, N. Y...*p. 526*

—Pipe Line
*BRAUN, C. F. & CO., San Francisco, Cal...*pp. 156, 157*

ANEMOMETERS
Davis Instrument Mfg. Co. (Inc.), 110 W. Fayette St., Baltimore, Md.
Queen-Gray Co., 616-620 Chestnut St., Philadelphia, Pa.

ANGLE PLATES (Universal)
Boston Scale & Machine Co., 100 Ruggles St., Boston, Mass.

ANNEALING
*AMERICAN METAL TREATMENT CO., Elizabeth, N. J...*p. 535*
Bidle, W. S. Co., 1411 E. 45th St., Cleveland, Ohio
*ROCKWELL, W. S. CO., 50 Church St., New York, N. Y...*p. 529*
WILLIAMS, J. H. & CO., 70 Richards St., Brooklyn, N. Y...*p. 517*

ANTI-FRICTION METALS
(See Metals, Anti-Friction)

ANVILS
ATKINS, E. C. & CO. (Inc.), Indianapolis, Ind...*p. 506*
Hay-Budden Mfg. Co., 254 N. Henry St., Brooklyn, N. Y.
Yost Mfg. Co., Meadville, Pa.

APPARATUS: *See*
Absorption
Acetylene
Air Conditioning
Air Filtering
Assay
Cable Testing
Car Lighting
Causticizing
Chemical
Cutting
Dehumidifying
Distilling

Digitized by Google

Drying
Electric Testing
Explosives
Fire Fighting
Fuel Testing
Gas Analysis
Gas, Fuel
Hydrogen and Oxygen
Hydrogen Testing
Ignition
Impregnating
Lead Burning
Mechanical Draft
Metallographical
Oil Testing
Oxygen Testing
Paper Testing
Photomicrographic
Pyroxylin
Sampling
Sand Blast
Solvent Recovery
Steel Testing
Vacuum Drying
Water Controlling

ARBOR PRESSES
(See Presses, Arbor)

ARBORS
CLEVELAND TWIST DRILL CO., Cleveland, Ohio...*p. 502*
Cushman Chuck Co., Hartford, Conn.

ARCH PROTECTORS (Boiler)
Lamprey Co., Westfield, Mass.

ARCHES
—Boiler
BUDD GRATE CO., 2013 E. Letterly St., Philadelphia, Pa...*p. 123*
Chicago Tile Arch Furnace Co., 2600-10 W. Grand Ave., Chicago, Ill.
*TITUSVILLE IRON WORKS CO., Titusville, Pa...*p. 89*

—Combustion Chamber
*CASEY-HEDGES CO., Chattanooga, Tenn. ..*pp. 60, 61*
Detrick, M. H. Co., 549 W. Washington St., Chicago, Ill.
Green, A. P. Fire Brick Co., Mexico, Mo.
*ILLINOIS STOKER CO. ("Illinois"), Alton, Ill...*p. 117*
Liptak Fire Brick Arch Co. ("Liptak"). 846 Builders Exchange, Minneapolis, Minn.

—Fire Door
BUDD GRATE CO., 2013 E. Letterly St., Philadelphia, Pa...*p. 123*
*CASEY-HEDGES CO., Chattanooga, Tenn. ..*pp. 60, 61*
Lamprey Co., Westfield, Mass.
*TITUSVILLE IRON WORKS CO., Titusville, Pa...*p. 89*
*WASHBURN & GRANGER (Inc.), 50 Church Street, New York, N. Y...*p. 127*

—Ignition (Flat, Suspended)
*CASEY-HEDGES CO., Chattanooga, Tenn. ..*pp. 60, 61*
Chicago Tile Arch Furnace Co., 2600-10 W. Grand Ave., Chicago, Ill.
*EDGE MOOR IRON CO., Edge Moor, Del... *p. 65*
Factory Engineering Co., 760 Hippodrome, Prospect Ave., Cleveland, Ohio
Green Engineering Co., E. Chicago, Ind.
*ILLINOIS STOKER CO. ("Illinois"). Alton, Ill...*p. 117*
Liptak Fire Brick Arch Co. ("Liptak"), 846 Builders Exchange, Minneapolis, Minn.
Superheater & Engineering Co., 1816 Woolworth Bldg., New York, N. Y.
*WASHBURN & GRANGER (Inc.), 50 Church St., New York, N. Y...*p. 127*

—Rear-Combustion Chamber
BUDD GRATE CO., 2013 E. Letterly St., Philadelphia, Pa...*p. 123*
*CASEY-HEDGES CO., Chattanooga, Tenn. ..*pp. 60, 61*
Factory Engineering Co., 760 Hippodrome Prospect Ave., Cleveland, Ohio
*TITUSVILLE IRON WORKS CO., Titusville, Pa. *p. 89*
*WASHBURN & GRANGER (Inc.), 50 Church St., New York, N. Y...*p. 127*

—Sectional (Locomotive)
American Arch Co., Inc., 14 East 42nd St., New York, N. Y.

—Water (For Boilers)
Lamprey Co., Westfield, Mass.

ARMORING MACHINES (Hose or Cable)
AMERICAN INSULATING MACHINERY CO., Philadelphia, Pa...*p. 638*

ASBESTOS PRODUCTS
Acme Asbestos Covering & Supply Co., 1302 Fulton St., Chicago, Ill.
Anchor Packing Co., 7th & Filbert Sts., Philadelphia, Pa.
*GREENE, TWEED & CO. ("Palmetto"), 109 Duane St., New York, N. Y...*p. 250*
Asbestos & Rubber Works of America (Inc.), 1821 Broadway, New York, N. Y.
Aycock, R. V. Co., 1702 Grand Ave., Kansas City, Mo.
CAREY, PHILIP CO., Cincinnati, Ohio *p. 245*
Central Asbestos & Magnesia Co., 214-216 W. Grand Ave., Chicago, Ill.
Dominion Asbestos & Rubber Corpn., 154 Nassau St., New York
EHRET MAGNESIA MFG. CO., Valley Forge, Pa...*p. 245*
Fibre Cell Asbestos Mfg. Co., 407-409 S. Clinton St., Chicago, Ill.
FRANKLIN MFG. CO., Franklan, Pa...*p. 245*
General Asbestos & Rubber Co. ("Garco"), Charleston, S. C.
Illinois Fire Proof Covering Co. (Inc.), 216 W. Kinzie St., Chicago, Ill.
Janos Asbestos Co., 26 Cortlandt St., New York
*JOHNS-MANVILLE (Inc.), New York, N. Y...*p. 244*
KEASBEY & MATTISON CO., Ambler, Pa. ..*p. 245*
Keasbey, Robert A. Co., 445 West Street, New York, N. Y.
*MAGNESIA ASSOCIATION OF AMERICA, Bulletin Bldg., Philadelphia, Pa...*p. 245*
Mikesell Brothers Co., 156 N. La Salle St., Chicago, Ill.
National Asbestos Mfg. Co., 163-93 Henderson St., Jersey City, N. J.
Nightingale & Childs Co., 205 Congress St., Boston, Mass.
Norristown Magnesia & Asbestos Co., Norristown, Pa.
Richards Mfg. Co., 325 Scribner Ave., Grand Rapids, Mich.
Sall Mountain Co., 230 S. La Salle St., Chicago, Ill.
Thermoid Rubber Co., Trenton, N. J.

ASH CANS
GENDER, PAESCHKE & FREY CO., ("Cream City") Wertim Valley, Milwaukee, Wis...*p. 434*
GILLIS & GEOGHEGAN, 543 Broadway, New York, N. Y...*p. 406*

ASH HANDLING SYSTEMS
Barney & Co., 477 Eighth Ave., New York, N. Y.
Combustion Engineering Corpn. ("Combusco"), Broad St., New York, N. Y.
Conveyors Corporation of America, 326 W. Madison St., Chicago, Ill.
JEFFREY MFG. CO., 904 N. 4th St., Columbus, Ohio...*pp. 376, 377*
WELLER MFG. CO., 1820-1856 N. Kostner Ave., Chicago, Ill...*p. 381*

As

Digitized by Google

—Steam Jet
Brady, James A. Foundry Co., 45th & Western Blvd., Chicago, Ill.
FREDERICK ENGINEERING CO., Frederick, Md...*p. 116*
Girtanner Engineering Corp., 1400 Broadway, New York, N. Y.
Green Engineering Co., East Chicago, Ind.
United Conveyor Corpn., 1500 Old Colony Bldg., Chicago, Ill.

ASH LIFTS
Ernst, Chas K., 1001 E. Ferry St., Buffalo, N. Y.
MORRIS, HERBERT, (INC.), 1-15 Lawrence Place, Buffalo, N. Y...*p. 402*
*SEDGWICK MACHINE WORKS, 146 W. 15th St., New York, N. Y...*p. 407*
*WASHBURN & GRANGER, (Inc.), 50 Church St., New York, N. Y...*p. 127*

—Telescopic
BARTLETT, C. O. & SNOW CO., Cleveland, Ohio...*p. 367*
GILLIS & GEOGHEGAN, 543 W. Broadway, New York, N. Y...*p. 406*
*WASHBURN & GRANGER, (Inc.) (''Dean''), 50 Church St., New York, N Y...*p. 127*
WELLER MFG. CO., 1820-1856 N. Kostner Ave., Chicago, Ill...*p. 381*

ASPHALT
Quinlan, Warner Co., 79 Wall St., New York, N. Y.

ASSAY APPARATUS
Buffalo Dental Mfg. Co., 587-589 Main St. Buffalo, N. Y.
STURTEVANT MILL CO., Harrison Sq., Boston 22, Mass...*pp. 600, 601*

AUGER MACHINES
CHAMBERS BROS. CO., Philadelphia, Pa *p. 599*

—Coal
Fairmont Mining Machinery Co., Fairmont, W. Va.

AUTOCLAVES
DEVINE, J. P. CO., 1375 Clinton St., Buffalo, N. Y...*pp. 606, 607*

AUTOMOBILE BODY MACHINERY
*BLISS, E. W. CO., Brooklyn, N. Y...*pp. 438, 439*
Pettingell Machine Co., Amesbury, Mass.
QUICKWORK CO., (''Quickwork''), St. Mary's, Ohio *p. 444*

AUTOMOBILE FENDER MACHINERY
QUICKWORK CO., (''Quickwork''), St. Mary's Ohio...*p. 444*
Yoder Co., Walworth Ave. at W. 58th St., Cleveland, Ohio.

AUTOMOBILE PARTS
Ashley Machine Works, 714 University Ave., Rochester, N. Y.
Chicago Screw Co., Fillmore & Homan Ave., Chicago, Ill.
Defiance Screw Machine Products Co., 731 Perry St., Defiance, Ohio
Fisher Machine Co., 301-316 N. 11th St., Philadelphia, Pa.
Lippincott-Carwen Corp'n, Erie Ave. & Richmond St., Philadelphia, Pa.
New York Gear Works, 56 Greenpoint Ave., Brooklyn, N. Y.
PROVIDENCE ENGINEERING CORP'N, Providence, R. I...*p. 12*
Spacke Machine & Tool Co., Indianapolis, Ind.
WILLIAMS, J. H. & CO., 70 Richards St., Brooklyn, N. Y...*p. 517*

—Pressed Steel
AMERICAN PULLEY CO., 4200 Wissahickon Ave., Philadelphia, Pa...*p. 322*
Detroit Pressed Steel Co., 6660 Mt. Elliot Ave., Detroit, Mich.
Federal Pressed Steel Co., Milwaukee, Wis.
Janney, Steinmetz & Co., 1421 Chestnut St., Philadelphia, Pa.
Savage Arms Corp'n., 50 Church St., Sharon, Pa.

AUTOMOBILE PARTS MACHINERY
*BLISS, E. W. CO., Brooklyn, N. Y...*pp. 438, 439*

AXLES
Cleveland City Forge & Iron Co., 45th St. & Lakeside Ave., Cleveland, Ohio
Cross Gear & Engine Co., 800-806 Bellevue Ave., Detroit, Mich.
*FULLER-LEHIGH CO., Fullerton, Pa. *p. 128*
Liggett Spring & Axle Co., Monongahela, Pa.
Torbenson Axle Co., 1115 E. 152nd St., Cleveland, Ohio
Union Drop Forge Co., 358 W. Grand Ave., Chicago, Ill.

—Automobile and Truck
Bradley, Osgood Car Co., Worcester, Mass.
Bridgeport Engineering Co., Bridgeport, Conn.
Empire Axle Co., Dunkirk, N. Y.
Hamilton Gear Co., Ltd., 76 Van Horne St., Toronto, Can.
Industrial Equipment Co., 70th & Garfield Ave., Oakland, Cal.
Keystone-Hindley Gear Co., 20th St. & Indiana Ave., Philadelphia, Pa.
Sheldon Axle & Spring Co., Wilkes-Barre, Pa.
Spacke Machine & Tool Co., Indianapolis, Ind.
*VOGT, HENRY MACHINE CO., Louisville, Ky...*pp. 632, 633*
Western Drop Forge Co., Marion, Ind.
WILLIAMS, J. H. & CO., 70 Richards St., Brooklyn, N. Y...*p. 517*

—Car and Locomotive
BASS FOUNDRY & MACHINE CO., Fort Wayne, Ind...*p. 57*
Camden Forge Co., Mt. Ephraim Ave., Camden, N. J.
Johnson, J. R. & CO., (Inc.), P. O. Box 515, Richmond, Va.
Pittsburgh Forge & Iron Co., 1003 Penn Ave., Pittsburgh, Pa.

B

BABBITT METAL
ALLAN, A. & SON, Harrison, N. J...*p. 413*
Ajax Metal Co., 46 Richmond St., Philadelphia, Pa.
American Crucible Products Co., (''Promet''), Elyria, Ohio
ATKINS, E. C. & CO., (Inc.), Indianapolis, Ind...*p. 506*
BUDD GRATE CO., 2013 East Letterly St., Philadelphia, Pa...*p. 123*
Cadman, A. W. Mfg. Co., 2814 Smallman St., Pittsburgh, Pa.
Damascus Bronze Co., Pittsburgh, Pa.
Empire Metal Co., Syracuse, N. Y.
Frictionless Metal Co., (''Frictionless''), 1103 Chestnut St., Chattanooga, Tenn.
Jacobson, I. M. & Sons Co., (''Motex'') 920-928 Catherine St., Detroit, Mich.
Jerome-Edwards Metallic Packing, 3126-3138 W. Chicago, Ave., Chicago, Ill.
Leddell Metals Co., (Inc.), 281 Borden Ave., Long Island City, N. Y.
LUMEN BEARING CO., Buffalo, N. Y...*p. 416*
Magnolia Metal Co., 113-115 Bank St., New York

Digitized by Google

Marx, A. & Sons, 1645 Tchoupitoulas St., New Orleans, La.
Merchant & Evans Co., 2019-2035 Washington Ave., Philadelphia, Pa.
Murdoch, H. & Co., 432 Wood St., Pittsburgh, Pa.
Murphy Metals Co., ("Murphy"), 1327 La Salle St., Chicago, Ill.
National Lead Co., ("Dutch Boy"), 111 Broadway, New York, N. Y.
Pacific Metal Works, 153 First St., San Francisco, Cal.
Pittsburgh White Metal Co., 160 Leroy St., New York, N. Y.
Premium Metal & Packing Co., ("Alumaloy"), Wilkinsburg, Pittsburgh, Pa.
Riverside Metal Refining Co., Connellsville, Pa.
*WESTINGHOUSE ELECTRIC & MFG. CO., East Pittsburgh, Pa...*pp. 160, 161*

BAFFLES, BOILER
Botfield Specialties Co., 776 S. Swanson St., Philadelphia, Pa.
ENGINEER CO., ("Turner Baffle Walls") 17 Battery Place, New York, N. Y...*pp. 108, 109*
Jointless Fire Brick Co., ("Plibrico"), 1130 Clay St., Chicago, Ill.
*KING REFRACTORIES CO., (Inc.) ("Mono"), 1709 Niagara St., Buffalo, N. Y...*p. 137*

BAG FILLING MACHINES
Brown Bag Filling Machine Co., Fitchburg, Mass.
National Packaging Machinery Co., 174 Green St., Jamaica Plain, Boston, Mass.
POOLE ENGINEERING & MACHINE CO., Woodberry, Baltimore, Md...*pp. 316-317*

BAG MAKING MACHINES
Brown Bag Filling Machine Co., Fitchburg, Mass.

BAKELITE
*CONTINENTAL FIBRE CO., Newark, Del. *p. 418*
General Bakelite Co., 2 Rector St., New York, N. Y.

BAKERS' MACHINERY
Day, J. H. Co., 1144 Harrison Ave., Cincinnati, Ohio
Ruger, J. W. Mfg. Co., 222 Chicago St., Buffalo, N. Y.

BALANCED DRAFT SYSTEMS
*ENGINEER CO., ("Balanced Draft"), 17 Battery Place, New York..*pp. 108, 109*

BALANCES
—Analytical
Ainsworth, Williams & Sons, 2151 Lawrence St., Denver, Col.
Central Scientific Co., 460 E. Ohio St., Chicago, Ill.
Eimer & Amend, 205 Third Ave., New York, N. Y.
Torsion Balance Co., 92 Reade St., New York, N. Y.

—Spring
Chatillon, John & Sons, 85-93 Cliff St., New York, N. Y.
Computing Scale Co., Dayton, Ohio

BALANCING MACHINES
NORTON CO., Worcester, Mass...*pp. 489, 510*
OLSEN, TINIUS TESTING MACHINE CO., ("Olsen-Carwen"), 500 North 12th St., Philadelphia, Pa...*pp. 265, 266, 267*
Vibration Specialty Co., Philadelphia, Pa.

BALANCING WAYS
Anderson Bros. Mfg. Co., 1911 Kishwaukee St., Rockford, Ill.

BALL BEARINGS, CRANKS, GAGES, JOINTS, MILLS, ETC.
(See Bearings, Cranks, Gages, Joints, Mills, etc., Ball)

BALL CUPS, PRESSED STEEL
Matthews Mfg. Co., 104 Gold St., Worcester, Mass.

BALL WINDING MACHINES
FRANKLIN MACHINE CO., ("Franklin"), P. O. Box 1393, Providence, R. I...*p. 9*

BALLS
—Brass and Bronze
AUBURN BALL BEARING CO., 22 Elizabeth St., Rochester, N. Y...*p. 340*
Beaver, H. Leroy, 1630 Walnut St., Philadelphia, Pa.
Draper Mfg. Co., 2417 Wright St., Port Huron, Mich.
*GWILLIAM CO., 23 Flatbush Ave., Brooklyn, N. Y...*pp. 356, 357, 358*
Hoover Steel Ball Co., Ann Arbor, Mich.
Jones Ball Co., P. O. Box 36, Arlington Heights, Mass.
*S. K. F. INDUSTRIES, (Inc.), 165 Broadway, New York, N. Y...*pp. 348, 349, 350*
Watertown Specialty Co., 112 E. Moulton St., Watertown, N. Y.

—Burnishing
Abbott Ball Co., Hartford, Conn.
AUBURN BALL BEARING CO., 22 Elizabeth St., Rochester, N. Y...*p. 340*
Beaver, H. Leroy, 1630 Walnut St., Philadelphia, Pa.
*GWILLIAM CO., 23 Flatbush Ave., Brooklyn, N. Y...*pp. 356, 357, 358*
*S. K. F. INDUSTRIES, (Inc.), 165 Broadway, New York, N. Y...*pp. 348, 349, 350*

—Cast Iron Chilled
*FULLER-LEHIGH CO., Fullerton, Pa. *p. 128*

—Monel Metal
Hoover Steel Ball Co., Ann Arbor, Mich.

—Steel
Abbott Ball Co., Hartford, Conn.
AUBURN BALL BEARING CO., 22 Elizabeth St., Rochester, N. Y...*p. 340*
Beaver, H. Leroy, 1630 Walnut St., Philadelphia, Pa.
Columbia Steel Co., 503 Market St., San Francisco, Cal.
Federal Bearings Co., Inc., 110 William St. Poughkeepsie, N. Y.
*GWILLIAM CO., 23 Flatbush Ave., Brooklyn, N. Y...*pp. 356, 357, 358*
Haring, Ellsworth, 114 Liberty St., New York
Hoover Steel Ball Co., Ann Arbor, Mich.
Jones Ball Co., P. O. Box 36, Arlington Heights, Mass.
NEW DEPARTURE MFG. CO., ("New Departure"), Bristol, Conn...*pp. 344, 345*
*S. K. F. INDUSTRIES, (Inc.), 165 Broadway, New York, N. Y...*pp. 348, 349, 350*
STANDARD STEEL & BEARINGS, (Inc.), ("Standard Chrome Alloy"), 366 Madison Ave., New York, N. Y...*p. 354*

BAROMETERS
Green, Henry J., 1191 Bedford Ave., Brooklyn, N. Y.
Precision Thermometer & Instrument Company, 1434 Brandywine St., Philadelphia, Pa.
*SCHAEFFER & BUDENBERG MFG. CO., Brooklyn, N. Y...*p. 295*
*UEHLING INSTRUMENT CO., 2011 Empire Bldg., New York, N. Y...*p. 286*

BAROMETRIC CONDENSERS
(See Condensers, Barometric)

BARREL FILLERS (Automatic)
Moran Flexible Steam Joint Co., 217 West Main St., Louisville, Ky.

Digitized by Google

BARREL SAND-BLASTS
New Haven Sand Blast Co., New Haven, Conn.
*PANGBORN CORP'N, P. O. Box 859, Hagerstown, Md...*pp. 636, 637*
Standard Equipment Co., 185 Church St., New Haven, Conn.

BARRELS
—Metal
Butler Mfg. Co., 1326 Grand Ave., Kansas City, Mo.
Cleveland Wire Spring Co., E. 38th & Hamilton Ave., Cleveland, Ohio
Franklin Valveless Engine Co., Franklin, Pa.
Sabin Machine Co., 6536 Carnegie Ave., Cleveland, Ohio
*SCAIFE, WM. B. & SONS CO., Oakmont, Pa...*pp. 143, 660*

—Working (Deep Well)
COOK, A. D., (Inc.), Lawrenceburg, Ind. *p. 585*

BARS
—Bearing Bronze
American Bronze Corp'n, (''Non-Gran''), Berwyn, Pa.
LUMEN BEARING CO., Buffalo, N. Y...*p. 416*

—Boring
ELMES, CHAS. F. ENGINEERING WORKS, 215 N. Morgan St., Chicago, Ill...*p. 591*
Kelly Reamer Co., 3705 W. 73rd St., Cleveland, Ohio
Madison Mfg. Co., Spring and Elton Sts., Muskegon, Mich.
Pedrick Tool & Machine Co., 3640 N. Lawrence St., Philadelphia, Pa.
Underwood, H. B. Corp'n, 1025 Hamilton St., Philadelphia, Pa.
WILLIAMS, J. H. & CO., 70 Richards St., Brooklyn, N. Y...*p. 517*

—Bronze, Cored
BUNTING BRASS & BRONZE CO., 720 Spencer St., Toledo, Ohio..*p. 337*
LUMEN BEARING CO., Buffalo, N. Y...*p. 416*

—Grate
Armstrong Mfg. Co., Springfield, Ohio
BASS FOUNDRY & MACHINE CO., Fort Wayne, Ind...*p. 57*
Beach Mfg. Co., Charlotte, Mich.
Blakeslee Mfg. Co., Du Quoin, Ill.
BUDD GRATE CO., 2013 East Letterly St., Philadelphia, Pa...*p. 123*
Canton Grate Co., 1711 Dillon Place, Canton, Ohio
*CASEY-HEDGES CO., Chattanooga, Tenn. *pp. 60, 61*
Coe, C. T. Co., 1014 Johnson St., Newark, N. J.
Crowe, Paul L., 33 Bidwell Ave., Jersey City, N. J.
*ERIE CITY IRON WORKS, Erie, Pa...*pp. 66, 67*
Fox Hill Foundry, Clinton, Grand & 12th Sts., Hoboken, N. J.
Heath Grate Bar Co., 12 Pearl St., Boston, Mass.
HULSON GRATE CO., Keokuk, Iowa..*pp. 124, 125*
Iron City Grate Bar Co., Warren, Ohio
*JONES, W. A. FOUNDRY & MACHINE CO., 4415 West Roosevelt Road, Chicago, Ill...*pp. 312, 313, 314, 315*
KEWANEE BOILER CO., Kewanee, Ill...*pp. 622, 623, 624*
Kramer Bros. Foundry Co., 51 Dell St., Dayton, Ohio
McCLAVE-BROOKS CO., (''McClave's''), Scranton, Pa...*p. 126*
McMillan & Co., 114 Clarkson Court, Chicago, Ill.
Mershon Patent Shaking Grate Works, 5750-52 Westminster Ave., Philadelphia, Pa.
MURRAY IRON WORKS CO., Burlington, Iowa..*pp. 80, 81*
Myerstown Foundry & Mfg. Co., 90 West St., New York, N. Y.
NEWBURGH STEAM BOILER WORKS, (P. Delany & Co.), Newburgh, N. Y...*p. 64*
New England Roller Grate Co., Indian Orchard, Mass.
St. John Grate Bar Co., Machy. Dept., The Bourse, Philadelphia, Pa.
Salamander Grate Bar Co., 126 Liberty St., New York City
Shear-Klean Grate Co., 811 Monadnock Bldg., Chicago, Ill.
Shevlin Engineering Co., (Inc.), 108 W. 34th St., New York
Thomas Grate Bar Co., (''W-S-D''), Birmingham, Ala.
*TITUSVILLE HORN WORKS CO., Titusville, Pa...*p. 89*
*U. S. CAST IRON PIPE & FOUNDRY CO., Burlington, N. J...*pp. 232, 233*
*WASHBURN & GRANGER, (Inc.), 50 Church St., New York, N. Y...*p. 127*

—Hammered
VULCAN STEAM FORGING CO., 247 Rano St., Buffalo, N. Y...*p. 433*

—Merchant
Franklin Steel Works, Franklin, Pa.
GLASGOW IRON CO., Pottstown, Pa...*p. 99*
Inland Steel Co., 1105 First National Bank Bldg., Chicago, Ill.
Lackawanna Steel Co., Buffalo, N. Y.
Youngstown Sheet & Tube Co., Youngstown, Ohio

—Reinforcing (Concrete Work)
Atlantic Steel Co., Atlanta, Ga.
Columbia Steel Co., 503 Market St., San Francisco, Cal.
Concrete Steel Co., (''Havemeyer''), 42 Broadway, New York
Franklin Steel Works, Franklin, Pa.
Inland Steel Co., 1105 First National Bank Bldg., Chicago, Ill.

—Rolled
Tacony Steel Co., Franklin Bank Bldg., Philadelphia, Pa.

—Staybolt
Falls Hollow Staybolt Co, 21 E. Portage St., Cuyahoga Falls, Ohio

—Steel
ANDREWS STEEL CO., Newport, Ky...*p. 421*
Atlantic Steel Co., Atlanta, Ga.
Bourne-Fuller Co., 1422 Euclid Ave., Cleveland, Ohio
Cincinnati Iron & Steel Co., Cincinnati, Ohio
Crowley, John A. Co., 120 Liberty St., New York, N. Y.
GLASGOW IRON CO., Pottstown, Pa...*p. 99*
Lancaster Steel Products Corp'n, Lancaster, Pa.
Republic Iron & Steel Co., Youngstown, Ohio

BATTERIES, STORAGE
Edison Storage Battery Co., Orange, N. J.
Electric Storage Battery Co., Allegheny Ave. & 19th St., Philadelphia, Pa.
FAIRBANKS-MORSE & CO., 900 S. Wabash Ave., Chicago, Ill...*p. 41*
Prest-O-Lite Company, Inc., 30 E. 42nd St., New York, N. Y.
U. S. Light & Heat Corp'n, (''USL''), Niagara Falls, N. Y.
Waterbury Battery Co., Waterbury, Conn.
Willard Storage Battery Co., Cleveland, Ohio
Witherbee Igniter Co., 132 Liberty St., Springfield, Mass.

Digitized by Google

BATTERY CHARGING OUTFITS
*GENERAL ELECTRIC CO., (''Tungar''), Schenectady, N. Y...*pp. 18, 19, 20, 21*

BEADING MACHINES
*BLISS, E. W. CO., Brooklyn, N. Y...*pp. 438, 469*

BEARING METALS
(See Metals, Bearing)

BEARING TESTING MACHINES
OLSEN, TINIUS TESTING MACHINE CO., 500 N. 12th St., Philadelphia, Pa...*pp. 265, 266, 267*
RIEHLE BROS. TESTING MACHINE CO., 1424 N. 9th St., Philadelphia, Pa...*p. 268*

BEARINGS

—Aluminum (Babbitt Lined)
*DOEHLER DIE-CASTING CO., (''Do-Lite''), Brooklyn, N. Y...*p. 426*

—Babbitt (Die Cast)
*DOEHLER DIE-CASTING CO., Brooklyn, N. Y...*p. 426*
Franklin, H. H. Mfg. Co., Syracuse, N. Y.
Legler-Eilerman Co., Dayton, Ohio
MILWAUKEE DIE CASTING CO., 297 Fourth St., Milwaukee, Wis...*p. 427*
Stewart Mfg. Corp'n, Wells St. Bridge, Chicago, Ill.

—Ball
Ahlberg Bearing Co., 317 E. 29th St., Chicago, Ill.
AUBURN BALL BEARING CO., (''Auburn''), 22 Elizabeth St., Rochester, N. Y...*p. 340*
Ball & Roller Bearing Co., Danbury, Conn.
Bantam Ball Bearing Co., Bantam, Conn.
BEARING CO. OF AMERICA, Lancaster, Pa...*p. 341*
Fafnir Bearing Co., New Britain, Conn.
Federal Bearings Co., Inc., 110 William St., Poughkeepsie, N. Y.
G-A Ball Bearing Mfg. Co., 123-141 Albany Ave., Chicago, Ill.
Gurney Ball Bearing Co., Jamestown, N. Y.
*GWILLIAM CO., 23 Flatbush Ave., Brooklyn, N. Y...*pp, 356, 357, 358*
Imperial Bearing Co., 6635 East Forest Ave., Detroit, Mich.
Joy Ball Bearing Co., 407-415 S. Aberdeen St., Chicago, Ill.
NEW DEPARTURE MFG. CO., (''New Departure''), Bristol, Conn...*pp. 344, 345*
Nice Ball Bearing Co., Land Title Bldg., Philadelphia, Pa.
*NORMA CO. OF AMERICA, Anable Ave., Long Island City, N. Y...*p. 351*
R. I. V. CO., 1765 Broadway, New York
Rhineland Machine Works Co., 1737 Broadway, New York
Rochester Ball Bearing Co., 2040 East Ave., Rochester, N. Y.
*S K F INDUSTRIES (Inc.), (S K F), 165 Broadway, New York..*pp. 348, 349, 350*
Schatz Mfg. Co., Poughkeepsie, N. Y.
Standard Machinery Co., Auburn, R. I.
STANDARD STEEL & BEARINGS, (Inc.), (''S. R. B.''), 366 Madison Ave., New York, N. Y...*p. 354*
Transmission Ball Bearing Co., (Inc.), 1050 Military Road, Buffalo, N. Y.
*U. S. BALL BEARING MFG. CO., (''Strom''), Palmer St. & Kolmar Ave., Chicago, Ill...*p. 355*

—Ball (Reground)
Ahlberg Bearing Co., 317 E. 29th St., Chicago, Ill.

—Bronze
ALLAN, A. & SON, Harrison, N. J...*p. 413*
Aluminum Manufactures, (Inc.), 6205 Carnegie Ave., Cleveland, Ohio
American Bearing & Die Casting Corp'n, 212 W. McCarty St., Indianapolis, Ind.
American Bronze Corp'n, (''Non-Gran''), Berwyn, Pa.
American Crucible Products Co., (''Promet''), Elysia, Ohio.
AMERICAN TOOL & MACHINE CO., Boston 9, Mass...*p. 614*
*BROWN, A. & F. CO., 79 Barclay St., New York, N. Y...*p. 303*
BUNTING BRASS & BRONZE CO., 720 Spencer St., Toledo, Ohio..*p. 337*
*CALDWELL, W. E. CO., (Inc.), 340 E. Brandeis St., Louisville, Ky...*p. 323*
Damascus Bronze Co., Pittsburgh, Pa.
DODGE SALES & ENGINEERING CO., Mishawaka, Ind...*pp. 42, 43, 326, 327, 328, 329*
*DOEHLER DIE-CASTING CO., Brooklyn, N. Y...*p. 426*
*JOHNSON BRONZE CO., New Castle, Pa. *p. 338*
LUMEN BEARING CO., (''Machinebronze''), Buffalo, N. Y...*p. 416*
METALINE CO., West Ave. near Borden, Long Island City, N. Y...*p. 339*
Paulson, Thomas & Son, (Inc.), (''Hecla''), 97 Second Ave., Brooklyn, N. Y.
*WOOD'S, T. B. SONS CO., Chambersburg, Pa...*pp. 334, 335*

—Bronze (Babbitt-Lined)
AMERICAN TOOL & MACHINE CO., Boston 9, Mass...*p. 614*
BUDD GRATE CO., 2013 E. Letterly St., Philadelphia, Pa...*p. 123*
BUNTING BRASS & BRONZE CO., 720 Spencer St., Toledo, Ohio..*p. 337*
*DOEHLER DIE-CASTING CO., Brooklyn, N. Y...*p. 426*
MILWAUKEE DIE CASTING CO., 297 Fourth St., Milwaukee, Wis...*p. 427*
Muzzy-Lyon Co., 517-535 W. Larned St., Detroit, Mich.
*WOOD'S, T. B. SONS CO., Chambersburg, Pa...*pp. 334, 335*

—Bronze and Graphite
BOUND BROOK OIL-LESS BEARING CO., (''Bound Brook''), Bound Brook, N. J. *p. 336*

—Fibre
*CONTINENTAL FIBRE CO., Newark, Del. *p. 418*

—Graphite
BOUND BROOK OIL-LESS BEARING CO., Bound Brook, N. J...*p. 336*
Randall Graphite Products Corp'n, 721 Fulton St., Chicago, Ill.

—Impregnated Wood
BOUND BROOK OIL-LESS BEARING CO., (''Nigrum''), Bound Brook, N. J...*p. 336*

—Oilless
Arguto Oilless Bearing Co., (''Arguto''), Wayne Junction, Philadelphia, Pa.
BOUND BROOK OIL-LESS BEARING CO., (''Bound Brook'', ''Nigrum''), Bound Brook, N. J...*p. 336*
Massachusetts Oilless Bearing Co., Worcester, Mass.
METALINE CO., West Ave. near Borden, Long Island City, N. Y...*p. 339*
Nolu Oilless Bearing Co., 6 E. Johnson St., Germantown, Philadelphia, Pa.

—Pressed Steel
*GWILLIAM CO., 23 Flatbush Ave., Brooklyn, N. Y...*pp. 356, 357, 358*

—Radial Thrust
American Ball Co., Providence, R. I.
Fafnir Bearing Co., New Britain, Conn.
Gurney Ball Bearing Co., Jamestown, N. Y.
*GWILLIAM CO., 23 Flatbush Ave., Brooklyn, N. Y...*pp. 356, 357, 358*
Joy Ball Bearing Co., 407-415 S. Aberdeen St., Chicago, Ill.

Be

Digitized by Google

NEW DEPARTURE MFG. CO., ("New Departure"), Bristol, Conn ..*pp. 344, 345*
*NORMA CO. OF AMERICA, Anable Ave., Long Island City, N. Y...*p. 351*
Schatz Mfg. Co., Poughkeepsie, N. Y.
*U. S. BALL BEARING MFG. CO., ("Strom"), Palmer St. & Kolmar Ave., Chicago, Ill...*p. 355*

—Roller

American Roller Bearing Co., 600 Melwood Ave., Pittsburgh, Pa.
Ball & Roller Bearing Co., Danbury, Conn.
Bantam Ball Bearing Co., Bantam, Conn.
Bower Roller Bearing Co., Detroit, Mich.
*GWILLIAM CO., 23 Flatbush Ave., Brooklyn, N. Y...*pp. 356, 357, 358*
Hart Roller Bearing Co., Orange, N. J.
HYATT ROLLER BEARING CO., ("Hyatt"), New York..*pp. 342, 343*
*NORMA CO. OF AMERICA, Anable Ave., Long Island City, N. Y...*p. 351*
Pratt, Wm. E. Mfg. Co., 190 N. State St., Chicago, Ill.
Railway Roller Bearing Co., Syracuse, N. Y.
*ROYERSFORD FOUNDRY & MACHINE CO., (Inc.), ("Sells"), 52 N. 5th St., Philadelphia, Pa...*pp. 346, 347*
Savage Arms Corp'n, 50 Church St., Sharon, Pa.
Standard Machinery Co., Auburn, R. I.
Standard Parts Co., 11th & Walnut Sts., Cleveland, Ohio
STANDARD STEEL & BEARINGS, (Inc.), (S. R. B.), 366 Madison Ave., New York, N. Y...*p. 354*
*TIMKEN ROLLER BEARING CO., Canton, Ohio..*pp. 352, 353*

—Self-Aligning, Thrust

*GWILLIAM CO., 23 Flatbush Ave., Brooklyn, N. Y...*pp. 356, 357, 358*

—Self-Oiling

AMERICAN TOOL & MACHINE CO., Boston 9, Mass...*p. 614*
*BROWN, A. & F. CO., 79 Barclay St., New York, N. Y...*p. 303*
*CALDWELL, H. W. & SON CO., 17th St. & Western Ave., Chicago, Ill...*p. 370*
*CALDWELL, W. E. CO., 340 E. Brandeis St., Louisville, Ky...*p. 323*
Cedar Rapids Fdry. & Machine Co., 901-998 2nd Ave., W. Cedar Rapids, Iowa
DODGE SALES & ENGINEERING CO., Mishawaka, Ind...*pp. 42, 43, 326, 327, 328, 329*
*FALLS CLUTCH & MACHINERY CO., Cuyahoga Falls, Ohio..*p. 330*
*HILL CLUTCH CO., Cleveland, Ohio..*p. 331*
JEFFREY MFG. CO., 904 N. 4th St., Columbus, Ohio..*pp. 376, 377*
*JONES, W. A. FOUNDRY & MACHINE CO., 4415 West Roosevelt Road, Chicago, Ill...*pp. 312, 313, 314, 315*
*MEDART PATENT PULLEY CO., St. Louis, Mo...*p. 333*
Nordyke & Marmon Co., Indianapolis, Ind.
WELLER MFG. CO., 1820-1856 N. Kostner Ave., Chicago, Ill...*p. 381*

—Self-Oiling (Adjustable)

*FALLS CLUTCH & MACHINERY CO., Cuyahoga Falls, Ohio..*p. 330*
Sauer Power Generating Co., 5115 Rosetta St., Pittsburgh, Pa.

—Thrust

Ahlberg Bearing Co., 317 E. 29th St., Chicago, Ill.
American Roller Bearing Co., 600 Melwood Ave., Pittsburgh, Pa.
AMERICAN TOOL & MACHINE CO., Boston 9, Mass. *p. 614*
AUBURN BALL BEARING CO., ("Auburn"), 22 Elizabeth St., Rochester, N. Y...*p. 340*
BEARING CO. OF AMERICA, Lancaster, Pa...*p. 341*
DODGE SALES & ENGINEERING CO., Mishawaka, Ind...*pp. 42, 43, 326, 327, 328, 329*
Fafnir Bearing Co., New Britain, Conn.
*FALLS CLUTCH & MACHINERY CO., Cuyahoga Falls, Ohio..*p. 330*
Federal Bearings Co., (Inc.), 110 Williams St., Poughkeepsie, N. Y.
G-A Ball Bearing Mfg. Co., 128-141 Albany Ave., Chicago, Ill.
*GWILLIAM CO., 23 Flatbush Ave., Brooklyn, N. Y...*pp. 356, 357, 358*
*HILL CLUTCH CO., Cleveland, Ohio..*p. 331*
Joy Ball Bearing Co., 407-15 S. Aberdeen St., Chicago, Ill.
Kingsbury, Albert, 532 Oliver Bldg., Pittsburgh, Pa.
Nice Ball Bearing Co., Land Title Bldg., Philadelphia, Pa.
*NORMA CO. OF AMERICA, Anable Ave., Long Island City, N. Y...*p. 351*
Railway Roller Bearing Co., Syracuse, N. Y.
Rochester Ball Bearing Co., (Inc.), 2040 East Ave., Rochester, N. Y.
*ROYERSFORD FOUNDRY & MACHINE CO., (Inc.), ("Sells"), 52 N. 5th St., Philadelpia, Pa...*pp. 346, 347*
*S K F INDUSTRIES, (Inc.), ("S K F"), 165 Broadway, New York..*pp. 348, 349, 350*
Suspension Bearing Co., Spartanburg, S. C.
*TIMKEN ROLLER BEARING CO., Canton, Ohio..*pp. 352, 353*
*U. S. BALL BEARING MFG. CO., ("Strom"), Palmer St. & Kolmar Ave., Chicago, Ill...*p. 355*

BEATERS (Paper Pulp)

VALLEY IRON WORKS CO., ("Niagara"), Appleton, Wis...*p. 647*

BEDS, RUBBING

*CALDWELL, H. W. & SON CO., 17th & Western Ave., Chicago, Ill...*p. 370*
Flory, S. Mfg. Co., Bangor, Pa.

BELT CONVEYORS

(See Conveyors, Belt)

BELT DRESSING

Baltimore Belting Co., 115 West Lombard St., Baltimore, Md.
Beltine Chemical & Mfg. Co., ("Beltine"), 6155 Wentworth Ave., Chicago, Ill.
Black Bear Co., 138-144 Temple St., Long Island City, N. Y.
Bradford Belting Co., 202 Walnut St., Cincinnati, Ohio
Burr Oak Belting Co., 1105-07 York St., Cincinnati, Ohio
Chesapeake Belting Co., 812-823 Homewood Ave., Baltimore, Md.
Chicago Belting Co., ("Beltex"), 113 N. Green St., Chicago, Ill.
Cling-Surface Co., 1048 Niagara St., Buffalo, N. Y.
Dawson Belting Co., ("Dawson"), 96 Warren St., New York, N. Y.
Duryea Mfg. Co., Ave. C & 2nd St., Bayonne, N. J.
Gandy Belting Co., 726-740 W. Pratt St., Baltimore, Md.
Ironsides Company, Hartman Bldg., Columbus, Ohio
Jobbers Mfg. Co., ("Blue Ribbon"), 327 S. La Salle St., Chicago, Ill.
Kruger & Blind Co., 513 Master St., Philadelphia, Pa.
Ladew, Edward R. Co., Inc., 428 Broadway, New York, N. Y.
Laurence Belting Co., Inc., 111 Chambers St., New York
Moloney Belting Co., 130 N. Franklin St., Chicago, Ill.

Digitized by Google

Mount Vernon Belting Co., (''Ease-On''), 327-333 Warren Ave., Baltimore, Md.
O'Brien Oil & Chemical Co., St. Louis, Mo.
Palmer, N. & Co., Bridgeport, Conn.
Raniville, F. Co., 241-243 Pearl St., Grand Rapids, Mich.
Reed & Duecker, Memphis, Tenn.
Rudoil Belting Co., 8th & Wallace Sts., Philadelphia, Pa.
SCHIEREN, CHAS. A. CO., 30-38 Ferry St., New York, N. Y...*pp. 362, 363*
Stephenson Mfg. Co., P. O. Box 380, Albany, N. Y.
Ulmer Leather Co., Norwich, Conn.
Victor Balata & Textile Belting Co., 38 Murray St., New York
Watt's, John M. Sons, 54 N. Second St., Philadelphia, Pa.

BELT FASTENERS
ATKINS, E. C. & CO., (Inc.), Indianapolis, Ind...*p. 506*
Clipper Belt Lacer Co., (''Clipper''), Grand Rapids, Mich.
Columbia Belt Hook Co., 1431-35 North 8th St., St. Louis, Mo.
Crescent Belt Fastener Co., 381 Fourth Ave., New York
FLEXIBLE STEEL LACING CO., (''Turtle'' ''High Duty''), 4638 Lexington St., Chicago, Ill...*p. 364*
*GREENE, TWEED & CO., (''Blakes''), 109 Duane St., New York, N. Y...*p. 250*

BELT HOOKS
Columbia Belt Hook Co., (''Stag''), 1431-35 North 8th St., St. Louis, Mo.

BELT LACERS
Clipper Belt Lacer Co., (''Clipper''), Grand Rapids, Mich.

BELT LACING
Eagle Counter & Leather Co., (''Eagle''), 414 E. 8th St., Cincinnati, Ohio
*GREENE, TWEED & CO., (''Manhattan''), 109 Duane St., New York, N. Y...*p. 250*
Meiers-Andres Belting Co., 128 Mulberry St., Newark, N. J.
Rahmann, Geo. & Co., 31 Spruce St., New York, N. Y.
SCHIEREN, CHAS. A. CO., 30-38 Ferry St., New York, N. Y...*pp. 362, 363*
Shackley, W. T. & Son, 49 High St., Boston, Mass.
Williams, I. B. & Sons, 9 Orchard St., Dover, N. H.

—Hinge
Clipper Belt Lacer Co., Grand Rapids, Mich.
FLEXIBLE STEEL LACING CO., (''Alligator'', ''Flexible''), 4638 Lexington St., Chicago, Ill...*p. 364*

—Steel
*BRISTOL CO., Waterbury, Conn...*p. 291*
Columbia Belt Hook Co., 1431-35 North 8th St., St. Louis, Mo.

BELT PLATES
Crescent Belt Fastener Co., 381 4th Ave., New York, N. Y.

BELT SHIFTERS
*HILL CLUTCH CO., Cleveland, Ohio..*p. 331*
*WOOD, T. B. SONS CO., Chambersburg, Pa...*pp. 334, 335*

BELT TIGHTENERS
AMERICAN TOOL & MACHINE CO., Boston 9, Mass...*p. 614*
*BROWN, A. & F. CO., 79 Barclay St., New York, N. Y...*p. 303*
*CALDWELL, H. W. & SON CO., 17th St. & Western Ave., Chicago, Ill...*p. 370*
*CALDWELL, W. E. CO., 340 E. Brandeis St., Louisville, Ky...*p. 323*
DODGE SALES & ENGINEERING CO., Mishawaka, Ind...*pp. 42, 43, 326, 327, 328, 329*
*FALLS CLUTCH & MACHINERY CO., Cuyahoga Falls, Ohio..*p. 330*
*FULLER-LEHIGH CO., Fullerton, Pa...*p. 128*
*HILL CLUTCH CO., Cleveland, Ohio..*p. 331*
HOGGSON & PETTIS MFG. CO., New Haven, Conn...*pp. 512, 513, 514*
Kremer-Cummins Machine Co., 1833 E. 55th St., Cleveland, Ohio
*MEDART PATENT PULLEY CO., St. Louis, Mo. *p. 333*
*SMIDTH, F. L. & CO., (''Lenix''), 50 Church St., New York, N. Y...*p. 604*
WELLER MFG. CO., 1820-1856 N. Kostner Ave., Chicago, Ill...*pp. 381, 422*
*WOOD'S T. B. SONS CO., Chambersburg, Pa...*pp. 334, 335*

BELTING

—Angular
Summer, Wm., Belting Co., Tolland, Conn.

—Balata
Bonner & Barnwall, (Inc.), 30 Church St., New York, N. Y.
Dick, R. & J. Co., (Inc.), (''Dickbelt''), Passaic, N. J.
Manheim Mfg. & Belting Co., Manheim, Pa.
Victor Balata & Textile Belting Co., (''V-B''), 38 Murray St., New York

—Canvas
Acme Belting Co., Niles, Mich.
Candy Belting Co., 726-740 W. Pratt St., Baltimore, Md.
Chesapeake Belting Co., 813-23 Homewood Ave., Baltimore, Md.
FAIRBANKS-MORSE & CO., 900 S. Wabash Ave., Chicago, Ill...*p. 41*
Hettrick Mfg. Co., Toledo, Ohio
Johnson Belting Co., 342 E. 38th St., New York, N. Y.
Nott, W. S. Co., 201-211 N. Third St., Minneapolis, Minn.

—Canvas (Stitched)
Candy Belting Co., 726-740 W. Pratt St., Baltimore, Md.
Carton Belting Co. (''Carton.'' ''Carzak''), 52 Everett St., Allston District, Boston, Mass.
Chesapeake Belting Co., 813-823 Homewood Ave., Baltimore, Md.
Dawson Belting Co., (''Aetna''), 96 Warren St., New York, N. Y.
Hettrick Mfg. Co., Toledo, Ohio
McIlroy Belting & Hose Co., Hammond, Ind.
Main Belting Co., (''Leviathan Anaconda''), 917 South 13th St., Philadelphia, Pa.
Manheim Mfg. & Belting Co., Manheim, Pa.
Mount Vernon Belting Co., (''Mount Vernon''), 327-333 Warren Ave., Baltimore, Md.
National Leather Belting Co., 423-435 E. 56th St., New York.
ROSSENDALE-REDDAWAY BELTING & HOSE COMPANY, (The), (''Senegal''. ''Seminole,'' ''Cherokee''), Newark, N. J...*p. 361*
Ruboil Belting Co., 8th & Wallace Sts., Philadelphia, Pa.
Victor Balata & Textile Belting Co., (''Ampire'', ''Special''), 38 Murray St., New York, N. Y.

—Chain Link
(See Chain Belts and Links)

—Conveyor
Boston Belting Co., 84 Linden Park St., Boston, Mass.
Burrell Belting Co., 413-417 S. Hermitage Ave., Chicago, Ill.
Dick, R. & J. Co., (Inc.), (''Dickbelt''), Passaic, N. J.
Duryea Mfg. Co., (''Wooster''), Bayonne, N. J.

Be

Digitized by Google

Gilmer, L. H. Co., Tacony, Philadelphia, Pa.
GOODRICH, B. F. RUBBER CO., Akron, Ohio..*pp. 258, 259*
Goodyear Tire & Rubber Co., Akron, Ohio
Imperial Belting Co., (''Sahara''), Lincoln & Kinzie Sts., Chicago, Ill.
JEFFREY MFG. CO., 904 N. 4th St., Columbus, Ohio..*pp. 376, 377*
LAMSON CO., 100 Boyleston St., Boston, Mass...*pp. 378, 379*
Manhattan Rubber Mfg. Co., 61 Willett St., Passaic, N. J.
Manheim Mfg. & Belting Co., Manheim, Pa.
NEW YORK RUBBER CO., 34 Reade St., New York, N. Y...*pp. 260, 261*
Paulus, Jos. C. & Co., 2507-11 Potter St., Philadelphia, Pa.
Quaker City Rubber Co., (''Desert'', ''Quaker City'', ''Crown''), 629 Market St., Philadelphia, Pa.
Republic Rubber Company, Youngstown, Ohio
ROBINS CONVEYING BELT CO., Park Row Bldg., New York, N. Y...*p. 373*
ROSSENDALE-REDDAWAY BELTING & HOSE COMPANY, (The), (''Daleway''), Newark, N. J...*p. 361*
Ruboil Belting Co., 8th & Wallace Sts., Philadelphia, Pa.
Scandinavia Belting Co., 106-108 Reade St., New York
Stanley Belting Corp'n, (''Stanley''), 37 S. Clinton St., Chicago, Ill.
Victor Balata & Textile Belting Co., 38 Murray St., New York

—Cotton
Acme Belting Co., Niles, Mich.
Bonner & Barnwall, (Inc.), 30 Church St., New York, N. Y.
Burrell Belting Co., 413-417 S. Hermitage Ave., Chicago, Ill.
Empire Mfg. Co., 97 Spring St., Lockport, N. Y.
Gilmer, L. H. Co., Philadelphia, Pa.
McIlroy Belting & Hose Co., Hammond, Ind.
Nott, W. S. Co., 201-211 N. Third St., Minneapolis, Minn.
ROSSENDALE-REDDAWAY BELTING & HOSE COMPANY, (The), (''Durbar''), Newark, N. J...*p. 361*
Stanley Belting Corp'n, (''Stanley''), 37 S. Clinton St., Chicago, Ill.

—Cotton-Leather
Summer, Wm. Belting Co., Tolland, Conn.

—Elevator
Dick, R. & J. C., (Inc.), (''Dickbelt''), Passaic, N. J.
GOODRICH, B. F. RUBBER CO., Akron, Ohio..*pp. 258, 259*
NEW YORK RUBBER CO., 34 Reade St., New York City..*pp. 260, 261*

—Endless
Acme Belting Co., Niles, Mich.
Brown, Arthur S., Mfg. Co., (''Tilton''), Tilton, N. H.
Gilmer, L. H. Co., Tacony, Philadelphia, Pa.
GOODRICH, B. F. RUBBER CO., Akron, Ohio..*pp. 258, 259*
Walls, T. P. Tool & Supply Co., (''Marathon''), 75-77 Walker St., New York, N. Y.

—Fabric
Acme Belting Co., Niles, Mich.
Burrell Belting Co., 413-417 S. Hermitage Ave., Chicago, Ill.
Duryea Mfg. Co., (''Wooster''), Bayonne, N. J.
Imperial Belting Co., Lincoln & Kinzie Sts., Chicago, Ill.
Mount Vernon Belting Co., (''Obstitch''), 327-333 Warren Ave., Baltimore, Md.
ROSSENDALE-REDDAWAY BELTING & HOSE COMPANY, (The), (''Daleway''), Newark, N. J...*p. 361*

—Fabric (Leather Faced)
Peerless Belting Co., Gardenville Station, Buffalo, N. Y.

—Hair
ROSSENDALE-REDDAWAY BELTING & HOSE COMPANY, (The). (''Camel Hair''), Newark, N. J...*p. 361*

—Leather
Albany Belting & Supply Co., 372 Broadway, Albany, N. Y.
Alexander Bros., 414 N. 3rd St., Philadelphia, Pa.
American Belting & Tanning Co., 135 Oliver St., Boston, Mass.
Baltimore Belting Co., 115 West Lombard St., Baltimore, Md.
Barnes, Henry K. Co., 234 Devonshire St., Boston, Mass.
Bay State Belting Co., 349 Congress St., Boston, Mass.
Bond, Charles Co., 617-619 Arch St., Philadelphia, Pa.
Bonner & Barnwall, (Inc.), 30 Church St., New York, N. Y.
Bradford Belting Co., 202 Walnut St., Cincinnati, Ohio
Brooklyn Leather Belting Co., Cor. Berry & S. Sixth Sts., Brooklyn, N. Y.
Burr Oak Belting Co., 1105-07 York St., Cincinnati, Ohio
California Belting Co., (Inc.), 1459-61-63 Mission St., San Francisco, Cal.
Central Belting Co., 151 Lafayette St., New York
Chicago Belting Co., 113 N. Green St., Chicago, Ill.
Coe & Brown Co., New Haven, Conn.
Consolidated Belting Co., 2 Jeffrey St., Chester, Pa.
Cook, H. N. Belting Co., 401 Howard St., San Francisco, Cal.
Couse & Bolton, 42 Lafayette St., Newark, N. J.
Cowan, Andrew & Co., 421-423 W. Main St., Louisville, Ky.
Cross Bros. & Co., 112-114 Mill St., Rochester, N. Y.
DETROIT OAK BELTING CO., (''Best Grade'', ''Naiad''), Detroit, Mich...*p. 360*
Druid Oak Belting Co., (Inc.), 111 E. Lombard St., Baltimore, Md.
Eagle Counter & Leather Co., 414 E. 8th St., Cincinnati, Ohio
Etsweiler, William Co., 230 N. 3rd St., Philadelphia, Pa.
Evansville Leather & Belting Co., 429 Sycamore St., Evansville, Ind.
FAIRBANKS-MORSE & CO., 900 S. Wabash Ave., Chicago, Ill...*p. 41*
Fisher Leather Belting Co., 221 N. 3rd St., Philadelphia, Pa.
Forster, John M. Co., 110 Mill St., Rochester, N. Y.
Grand Rapids Belting Co., 1-3 Ionia Ave., Grand Rapids, Mich.
Graton & Knight Mfg. Co., (''Heart'', ''Graknight'', ''Sparoak''), Worcester, Mass.
Hide Leather & Belting Co., (''Wetprufe'', ''Vee-Sol''), 229-233 S. Meriden St., Indianapolis, Ind.
Himmelein & Bailey, 248 Chestnut St., Philadelphia, Pa.
Holyoke Belting Co., 66-68 Winter St., Holyoke, Mass.
Horton Machine Works, (Inc.), 104-106 W. Fourth St., Elmira, N. Y.
Houghton, E. F. & Co., (''Vim''), 240 W. Somerset St., Philadelphia, Pa.
Hudson Belting Co., Worcester, Mass.

Digitized by Google

Ireson, Charles L., 221 High St., Boston, Mass.
Jewell Belting Co., Hartford, Conn.
Johnson Belting Co., 342 E. 38th St., New York, N. Y.
Ladew, Edward R. Co., (Inc.), (''Hoyt's Flintstone''), 428 Broadway, New York, N. Y.
Laurence Belting Co., (Inc.,) 111 Chambers St., New York, N. Y.
McCauley Belting Co., 412-430 Orleans St., Chicago, Ill.
MacWatty Belting Co., 7 Beverly St., Providence, R. I.
Meiers-Andres Belting Co., 128 Mulberry St., Newark, N. J.
Missouri Belting Co., 1021-29 S. Grand Ave., St. Louis, Mo.
Moloney Belting Co., 130 N. Franklin St., Chicago, Ill.
National Leather Belting Co., 423-435 E. 56th St., New York.
New York Leather Belting Co., 428-30 Broadway, Brooklyn, N. Y.
Norwich Belting Co., Norwich, Conn.
Nott, W. S. Co., 201-211 N. Third St., Minneapolis, Minn.
Olmsted-Flint Co., Cambridge, Mass.
Page Belting Co., Concord, N. H.
Palmer, N. & Co. (''Charter Oak''), Bridgeport, Conn.
Paulus, Jos. C. & Co., 2507-11 Potter St., Philadelphia, Pa.
Philadelphia Belting Co., Sixth & Spring Garden Sts., Philadelphia, Pa.
Rahmann, G. & Co., 31 Spruce St., New York, N. Y.
Raniville, F. Co., 241-243 Pearl St., Grand Rapids, Mich.
Reed & Duecker, Memphis, Tenn.
Rhoads, J. E. & Sons (''Tannate''), 12 N. Third St., Philadelphia, Pa.
Salisbury, W. H. & Co., 308-310 Madison St., Chicago, Ill.
SCHIEREN, CHAS. A. CO., 30-38 Ferry St., New York, N. Y...*pp. 362, 363.*
Schwartz Belting Co., 76 Murray St., New York.
Shackley, W. T. & Son, 49 High St., Boston, Mass.
Shulz Belting Co., St. Louis, Mo.
Sikes, S. R. Co., Cor. 11th Ave. So. & 3rd St., Minneapolis, Minn.
Smyth-Despard Co., Broad & John Sts., Utica, N. Y.
Southern Belting Co:, Atlanta, Ga.
Strong & Hery Co., 301-307 State St., Rochester, N. Y.
Turner, J. S. Mfg. Co., 133 Middle St., Lowell, Mass.
Ulmer Leather Co., Norwich, Conn.
Union Belt Co., 66 Troy St., Fall River, Mass.
Walker's, Chas. W. Sons & Co., 288 Market St., Newark, N. J.
Warren Belting Co., 33 Arctic St., Worcester, Mass.
Western Rawhide & Belting Co., 901-935 Winnebago St., Milwaukee, Wis.
Whiting, Henry F., Lowell, Mass.
Williams, I. B. & Sons, 9 Orchard St., Dover, N. H.

—Rawhide
Chicago Rawhide Co., 1301 Elston Ave., Chicago, Ill.
Missouri Belting Co., 1021-29 S. Grand Ave., St. Louis, Mo.

—Round (Solid)
Holyoke Belting Co., 66-68 Winter St., Holyoke, Mass.
Missouri Belting Co., 1021-29 S. Grand Ave., St. Louis, Mo.
Rahmann & Co., 31 Spruce St., New York.
Rhodes, J. E. & Sons (''Tannate''), 12 N. Third St., Philadelphia, Pa.
SCHIEREN, CHAS. A. CO., 30-38 Ferry St., New York, N. Y...*pp. 362-363*
Summer, Wm. Belting Co., Tolland, Conn.
Western Rawhide & Belting Co., 901-935 Winnebago St., Milwaukee, Wis.

—Round (Twist)
SCHIEREN, CHAS. A. CO., 30-38 Ferry St., New York, N. Y...*pp. 362, 363*

—Rubber
Anchor Packing Co., 7th & Filbert Sts., Philadelphia, Pa.
Boston Belting Co., 84 Linden Park St., Boston, Mass.
Boston Woven Hose & Rubber Co., Cambridge, Mass.
Cincinnati Rubber Mfg. Co., Cincinnati, O.
Empire Rubber & Tire Co., Trenton, N. J.
FAIRBANKS-MORSE & CO., 900 S. Wabash Ave., Chicago, Ill...*p. 41*
GOODRICH, B. F. RUBBER CO., Akron, Ohio...*pp. 258, 259*
Gutta Percha & Rubber Mfg. Co., 126-128 Duane St., New York
Hamilton Rubber Mfg. Co., Trenton, N. J.
Maguire Rubber Co., 200 5th Ave., New York, N. Y.
Manhattan Rubber Mfg. Co., 61 Willett St., Passaic, New Jersey
Mercer Rubber Co., Hamilton Square, N. J.
N. J. Car Spring & Rubber Co., Jersey City, N. J.
New York Belting & Packing Co., 91-93 Chambers St., New York, N. Y.
NEW YORK RUBBER CO., 34 Reade St., New York, N. Y...*pp. 260, 261*
Pioneer Rubber Mills, 68 Sacramento St., San Francisco, Cal.
Quaker City Rubber Co. (''Ironsides'', ''Quaker City'', ''Crown''), 629 Market St., Philadelphia, Pa.
Salisbury, W. H. & Co., 308-310 W. Madison St., Chicago, Ill.
United States Rubber Co., 1790 Broadway, New York.
Voorhees Rubber Mfg. Co., 18-50 Bostwick Ave., Jersey City, N. J.

—Textile
ROSSENDALE-REDDAWAY BELTING AND HOSE COMPANY, (The), (''Daleway''), Newark, N. J...*p. 361*
Russell Mfg. Co. (''Rusco''), Middletown, Conn.
Scandinavia Belting Co., 106-108 Reade St., New York

—''V'' (Leather)
Craig Mfg. Co., Cedar Rapids, Iowa
SCHIEREN, CHAS. A. CO. 30-38 Ferry Street, New York, N. Y...*pp. 362, 363*

—Waterproof
American Belting & Tanning Co., 185 Oliver St., Boston, Mass.
Baltimore Belting Co., 115 West Lombard St., Baltimore, Md.
Bay State Belting Co., 349 Congress St., Boston, Mass.
Burr Oak Belting Co., 1105-07 York St., Cincinnati, O.
Central Belting Co., 151 Lafayette St., New York, N. Y.
Chicago Rawhide Mfg. Co., 1301 Elston Ave., Chicago, Ill.
Cook, H. N. Belting Co., 401 Howard St., San Francisco, Cal.
Couse & Bolten, 42 Lafayette St., Newark, N. J.
DETROIT OAK BELTING CO. (''Naiad'', ''Best Grade''), Detroit, Mich...*p. 360*
Dick, R. & J. Co. (Inc.), Passaic, N. J.
Druid Oak Belting Co. (Inc.), 111 E. Lombard St., Baltimore, Md.
Etsweiler, William Co., 30 N. 3rd St., Philadelphia, Pa.

Digitized by Google

Fisher Leather Belting Co., 221 N. 3rd St., Philadelphia, Pa.
Grand Rapids Belting Co., 1-3 Ionia Ave., Grand Rapids, Mich.
Graton & Knight Mfg. Co. (''Neptune'', ''Spartan''), Worcester, Mass.
Himmelein & Bailey, 248 Chestnut St., Philadelphia, Pa.
Imperial Belting Co. (''Submarine''), Lincoln & Kinzie Sts., Chicago, Ill.
Ladew, Edward R. Co., Inc., 428 Broadway, New York, N. Y.
Laurence Belting Co. (Inc.), 111 Chambers St., New York
McCauley Belting Co., 412-420 Orleans St., Chicago, Ill.
MacWatty Belting Co. (''Black Diamond''), 7 Beverly St., Providence, R. I.
Meier-Andres Belting Co., 128 Mulberry St., Newark, N. J.
Moloney Belting Co., 130 N. Franklin St., Chicago, Ill.
Olmsted-Flint Co., Cambridge, Mass.
Paulus, Jos. C. & Co., 2507-11 Potter St., Philadelphia, Pa.
Peerless Belting Co, Gardenville Station, Buffalo, N. Y.
Philadelphia Belting Co., Sixth & Spring Garden Sts., Philadelphia, Pa.
Reed & Duecker, Memphis, Tenn.
Scandinavia Belting Co., 106-108 Reade St., New York, N. Y.
SCHIEREN, CHAS. A. CO., 30-38 Ferry St., New York, N. Y...*pp. 362, 363*
Schwartz Belting Co., 76 Murray St., New York, N. Y.
Shultz Belting Co., St. Louis, Mo.

—Wire
Webb Mfg. Co., 245-247 N J. R. R. Ave., Newark, N. J.

—Woven (Solid)
Brown, Arthur S., Mfg. Co., Tilton, N. H.
Carton Belting Co. (''Azak''), 52 Everett St., Allston District, Boston, Mass.
Dawson Belting Co. (''America''), 96 Warren St., New York, N. Y.
Victor Balata & Textile Belting Co. (''Grip-On'', ''Liberty''), 38 Murray St., New York, N. Y.

BENCH DRAWERS (Steel)
Lupton's, David, Sons Co., Allegheny Ave. & Tulip St., Philadelphia, Pa.
NEW BRITAIN MACHINE CO., New Britain, Conn...*p. 463*

BENCH LEGS
AMERICAN TOOL & MACHINE CO., Boston 9, Mass...*p. 614*
Gardner General Foundry Co., Gardner, Mass.
Garwood Bronze & Iron Works, Garwood, N. J.
*HILL CLUTCH CO., Cleveland, Ohio...*p. 331*
*JONES, W. A. FOUNDRY & MACHINE CO., 4415 West Roosevelt Road, Chicago, Ill...*pp. 312, 313, 314, 315*
Lupton's, David Sons Co., Allegheny Ave. & Tulip St., Philadelphia, Pa.
NEW BRITAIN MACHINE CO., New Britain, Conn...*p. 463*

BENDING AND STRAIGHTENING MACHINES
BERTSCH & CO., Cambridge City, Ind...*p. 442*
GALLAND-HENNING MFG. CO., Milwaukee, Wis...*p. 592*
HYDRAULIC PRESS MFG. CO. (The), Mount Gilead, Ohio...*p. 593*
Kane & Roach, Niagara & Shonnard Sts., Syracuse, N. Y.
*LONG & ALLSTATTER CO., Hamilton, Ohio...*pp. 440, 441*
NILES-BEMENT-POND CO., 111 Broadway, New York, N. Y...*p. 470*
TORRINGTON MFG. CO., Torrington, Conn. ..*p. 641*
WATSON-STILLMAN CO., 35 Church St., New York, N. Y...*p. 596*
WOOD, R. D. & CO., Philadelphia, Pa...*p. 597*

BENDING MACHINES

—Angle
BERTSCH & CO., Cambridge City, Ind...*p. 442*
GALLAND-HENNING MFG. CO., Milwaukee, Wis...*p. 592*
Thomas Spacing Machine Co., 1226 Fulton Bldg., Pittsburgh, Pa.

—Hand
Hinman, D. A. & Co., Sandwich, Ill.

—Horizontal
*LONG & ALLSTATTER CO., Hamilton, Ohio...*pp. 440, 441*

—Hydraulic
BERTSCH & CO., Cambridge City, Ind...*p. 442*
Camden Iron Works, Camden, N. J.
ELMES, CHAS. F. ENGINEERING WORKS, 215 N. Morgan St., Chicago, Ill...*p. 591*
GALLAND-HENNING MFG. CO., Milwaukee, Wis...*p. 592*
HYDRAULIC PRESS MFG. CO. (The), Mount Gilead, Ohio...*p. 593*
NILES-BEMENT-POND CO., 111 Broadway, New York, N. Y...*p. 470*
WATSON-STILLMAN CO., 35 Church St., New York, N. Y...*p. 596*
WOOD, R. D. & CO., Philadelphia, Pa...*p. 597*

—Pipe
Federal Bending Machine Co., Opera House Bldg., Bayonne, N. J.
Underwood, H. B. Corpn., 1025 Hamilton St., Philadelphia, Pa.

—Plate
BERTSCH & CO., Cambridge City, Ind...*p. 442*
Hilles & Jones Co., Wilmington, Delaware
Ironton Punch & Shear Co., 511 N. 2nd St., Ironton, Ohio

—Tire
Boynton & Plummer (Inc.), Chester Depot, Vt.

BENDING ROLLS
(See Rolls, Bending)

BENDS, PIPE
Albright Son & Co., Allentown, Pa.
Ballwood Co., 30 Church St., New York
Best Co., 1409 Arvott Bldg., Pittsburgh, Pa.
*CRANE CO., 836 S. Michigan Ave., Chicago, Ill...*pp. 170, 171, 172, 173*
*DOUGHERTY, M. J. CO., 25th & Washington Ave., Philadelphia, Pa...*p. 234*
Lewis, Joseph E., 1218 Warner St., Baltimore, Md.
Limbert, Geo. B. & Co., 570 Fulton St., Chicago, Illinois
Mitchell, W. K. & Co. (Inc.), Ellsworth St. & Schuylkill River, Philadelphia, Pa.
NATIONAL PIPE BENDING CO., New Haven, Conn...*pp. 150, 151*
National Valve & Mfg. Co., Pittsburgh, Pa.
Parks-Cramer Co., 970 Main St., Fitchburg, Mass.
Pipe Coiling, Bending & Welding Co., Grant Ave. & B. & O. R.R., Sharpsburg, Pa.
Pittsburgh Piping & Equipment Co., 35th & Charlotte Sts., Pittsburgh, Pa.
*PITTSBURGH VALVE, FOUNDRY & CONSTRUCTION CO., P. O. Box 1016, Pittsburgh, Pa...*pp. 192, 193*
Power Piping Co., Beaver & Western Ave., Pittsburgh, Pa.

Digitized by Google

Roessing Mfg Co., Sharpsburg Sta., Pittsburgh, Pa.
Shaw-Kendall Engineering Co., 120-130 S. Superior St., Toledo, Ohio
SIMMONS PIPE BENDING WORKS, 40 Mechanic Street, Newark, N. J...*p. 235*
Whitney-McDonald Co., 2820 E. Tioga St., Philadelphia, Pa.

BENZOL RECOVERY PLANTS
Koppers, H. Co., 800 Union Arcade, Pittsburgh, Pa.

BILLETS
—Forging
ANDREWS STEEL CO., Newport, Ky...*p. 421*
Whitaker-Glessner Co., Wheeling, W. Va.
—Steel
ANDREWS STEEL CO., Newport, Ky...*p. 421*
American Tube & Stamping Co., Bridgeport, Conn.
Carbon Steel Co., Foot of 32nd St., Pittsburgh, Pa.
Crowley, John A. Co., 120 Liberty St., New York, N. Y.
Inland Steel Co., 1105 First National Bank Bldg., Chicago, Ill.
Pardee, C. Works, Perth Amboy, N. J.
Penn Seaboard Steel Corpn., Franklin Bank Bldg., Philadelphia, Pa.
*TIMKEN ROLLER BEARING CO., Canton, Ohio...*pp. 352, 353*
Whitaker-Glessner Co., Wheeling, W. Va.
Wood, Alan Iron & Steel Co., Widener Bldg., Philadelphia Pa.

BINS AND SHELVING (Steel)
Berger Mfg. Co. (''Berlor''), Canton, Ohio

BITS (Wood)
CLEVELAND TWIST DRILL CO, Cleveland, Ohio...*p. 502*
Murkland, J. W. Co., Barton, Vt.
Progressive Mfg. Co. (''Forstner''), Torrington, Conn.

BLACK PLATES
Inland Steel Co., 1105 First National Bank Bldg., Chicago, Ill.

BLACKSMITHS' MACHINERY
*INGERSOLL-RAND CO., 11 Broadway, New York, N .Y...*pp. 546, 547*

BLADES
—Doctor
Quality Saw Co., 91 Hale St., Haverhill, Mass.
—Hack Saw
American Saw & Mfg. Co., Springfield, Mass.
ATKINS, E. C. & CO. (Inc.), Indianapolis, Ind...*p. 506*
Goodell-Pratt Co., Greenfield, Mass.
Peerless Machine Co., 1615 Racine St., Racine, Wis.
Racine Tool & Machine Co.. Racine, Wis.
Robertson, W. Machine & Foundry Co., 58 Rano Street, Buffalo, N. Y.
*SIMONDS MFG. CO., Fitchburg, Mass... *p. 507*
*STARRETT, L. S. CO., Athol, Mass...*p. 508*
Sterling Products Co. (Inc.), (''Liberty''), 549 Washington Blvd., Chicago, Ill.
Thompson, Henry G., & Son Co., (Milford), New Haven, Conn.
VICTOR SAW WORKS (Inc.), (''Victor''), Springfield, Mass...*p. 509*
West Haven Mfg. Co., New Haven, Conn.
—Shear
MARCHANT, GEO. F. CO., 1420-28 S. Rockwell St., Chicago, Ill...*p. 505*

BLANKING MACHINES (Multiple Spindle)
NEW BRITAIN MACHINE CO., New Britain, Conn...*p. 463*

BLAST FURNACES, GATES, ETC.
(See Furnaces, Gates, Etc., Blast)

BLEACHING MACHINERY
PHILADELPHIA DRYING MACHINERY CO., 3351 Stokeley St., Philadelphia, Pa. ..*p. 610*

BLOCKS
—Chain Hoisting
(See Hoists, Chain)
—Die
Heppenstall Forge & Knife Co., 4620 Hatfield St., Pittsburgh, Pa.
McImes Steel Co. (Ltd.), Corry, Pa.
Tacony Steel Co., Franklin Bank Bldg., Philadelphia, Pa.
—Logging
*LIDGERWOOD MFG. CO., 96 Liberty St., New York, N. Y...*p. 388*
—Packing (Machine Table)
STANDARD SHOP EQUIPMENT CO., 23rd St. & Hunting Park Ave., Philadelphia. Pa...*p. 515*
—Rider
*AMERICAN FORGE & MACHINE CO., Canton, Ohio..*pp. 430, 431*
—Step (Machine Table)
STANDARD SHOP EQUIPMENT CO., 23rd St. and Hunting Park Ave., Philadelphia, Pa...*p. 515*
—Swage
Noyes, H. B. Co., Greenfield, Mass.
—Tackle
AMERICAN HOIST & DERRICK CO., St. Paul, Minn...*p. 388*
MORRIS, HERBERT (Inc.), 1-15 Lawrence Place, Buffalo, N .Y...*p. 402*
NEWHALL CHAIN FORGE & IRON CO., 90 West St., New York, N. Y...*p. 410*
Patterson, W. W. Co. (''Patterson''), 54 Water St., Pittsburgh, Pa.
Stowell Co., South Milwaukee, Wis.
Wright Mfg. Co., Lisbon, Ohio
—Wood (Creosoted)
Pittsburgh Wood Preserving Co., 1058 Century Bldg., Pittsburgh, Pa.

BLOOMS, STEEL
ANDREWS STEEL CO., Newport, Ky...*p. 421*
Penn Seaboard Steel Corpn., Franklin Bank Bldg., Philadelphia, Pa.
Whitaker-Glessner Co., Wheeling, W. Va.

BLOWERS
—Centrifugal
AMERICAN BLOWER CO. (''Sirocco''), Detroit, Mich...*p. 553*
CLARAGE FAN CO., Kalamazoo, Mich...*pp. 556, 557*
CONNELLSVILLE MFG. & MINE SUPPLY CO., Connellsville, Pa. *p. 384*
COPPUS ENGINEERING & EQUIPMENT CO.,342-348 Park Ave., Worcester, Mass. ..*pp. 104, 105*
DE LAVAL STEAM TURBINE CO., Trenton, N. J...*p. 26*
*GENERAL ELECTRIC CO., Schenectady, N. Y...*pp. 18, 19, 20, 21*
*GREEN FUEL ECONOMIZER CO., Beacon, N. Y...*pp. 96, 97*
JEFFREY MFG. CO., 904 N. 4th St., Columbus, Ohio. *pp. 376, 377*
*WESTINGHOUSE ELECTRIC & MFG. CO., East Pittsburgh, Pa...*pp. 160, 161*
—Fan
Abendroth, G. Irving Co., 10 E. 43d St., New York, N. Y.
*AMERICAN BLOWER CO. (''Sirocco''), Detroit, Mich...*p. 553*
Buckeye Blower Co., Town & Lucas Sts., Columbus, O.

Digitized by Google

Buffalo Forge Co., 490 Broadway, Buffalo, N. Y.
Carling Turbine Blower Co. (Inc.), Worcester, Mass.
Carlisle & Gale Co., 5 North St., East Cambridge, Mass.
CLARAGE FAN CO., Kalamazoo, Mich...*pp. 556, 557*
Columbus Heating & Ventilating Co., 425-445 West Town St., Columbus, O.
Connecticut Blower Co. (Inc.), 135 Sheldon St., Hartford, Conn.
CONNELLSVILLE MFG. & MINE SUPPLY CO., Connellsville, Pa...*p. 384*
COPPUS ENGINEERING & EQUIPMENT CO., 342-348 Park Ave., Worcester, Mass. ..*pp. 104, 105*
G. M. C. Engineering Co., Graphic Arts Bldg., Worcester, Mass.
Garden City Fan Co., McCormick Bldg., Chicago, Ill.
*GREEN FUEL ECONOMIZER CO., Beacon, N. Y...*pp. 96, 97*
Hersh Brothers Co., Allentown, Pa.
Ilg Electric Ventilating Co., Crawford Ave. near Diversy Blvd., Chicago, Ill.
Indiana Fan Co., 40 E. South St., Indianapolis, Ind.
JEFFREY MFG. CO., 904 No. 4th St., Columbus, Ohio...*pp. 376, 377*
*KERR TURBINE CO., Wellsville, N. Y...*p. 23*
Kirk & Blum Mfg. Co., Cincinnati, Ohio
Massachusetts Blower Co., Howard St., Watertown, Mass.
National Blow Pipe & Mfg. Co., 738 Dryades St., New Orleans, La.
NEW YORK BLOWER CO. (''Seri-Vane''), Chicago, Ill...*p. 555*
Seymour, J. M., Jr., 51-53 Lawrence St., Newark, N. J.
STURTEVANT, B. F. CO., Hyde Park, Boston, Mass...*p. 106*
Syracuse Industrial Gas Co., 206 McCarthy Bldg., Syracuse, N. Y.
*TERRY STEAM TURBINE CO., Hartford, Conn...*pp. 26, 27*
Western Blower Co., 1800 9th Ave., South Seattle, Wash.
*WESTINGHOUSE ELECTRIC & MFG. CO., East Pittsburgh, Pa...*pp. 160, 161*
WING, L. J. MFG. CO. (''Wing-Scruplex''), 352 W. 13th St., New York, N. Y...*pp. 107, 625*

—Forge
*AMERICAN BLOWER CO. (''Sirocco''), Detroit, Mich...*p. 553*
CLARAGE FAN CO., Kalamazoo, Mich...*pp. 556, 557*
*ROCKWELL, W. S. CO., 50 Church St., New York, N. Y...*p. 529*
STURTEVANT, B. F. CO., Hyde Park, Boston, Mass...*p. 106*
*WESTINGHOUSE ELECTRIC & MFG. CO., East Pittsburgh, Pa...*pp. 160, 161*
AMERICAN GAS FURNACE CO., Elizabeth, N. J...*p. 527*
Electric Blower Co., 352 Atlantic Ave., Boston, Mass.

—Organ
SPENCER TURBINE CO. (''Orgoblo''), Hartford, Conn...*p. 552*

—Pressure
*AMERICAN BLOWER CO. (''Sirocco''), Detroit, Mich...*p. 553*
AMERICAN GAS FURNACE CO., Elizabeth, N. J...*p. 527*
BEACH-RUSS CO., 50 Church St., New York, N. Y...*p. 560*
Champion Blower & Forge Co., Lancaster, Pa.
CLARAGE FAN CO., Kalamazoo, Mich...*pp. 556, 557*
CONNELLSVILLE MFG. & MINE SUPPLY CO., Connellsville, Pa...*p. 384*
Connersville Blower Co., Connersville, Ind.
Crescent Sales & Engr. Co. (''Roto Piston''), Detroit, Mich.
Crowell Mfg. Co., 296 Taaffe Place, Brooklyn, N. Y.
*DE LAVAL STEAM TURBINE CO., Trenton, N. J...*p. 22*
Eclipse Fuel Engineering Co., Rockford, Ill.
Garden City Fan Co., McCormick Bldg., Chicago, Ill.
*GREEN FUEL ECONOMIZER CO., Beacon, N. Y...*pp. 96, 97*
*KERR TURBINE CO., Wellsville, N. Y...*p. 23*
Kruger & Blind Co. (''Lebran''), 513 Master St., Philadelphia, Pa.
*INGERSOLL-RAND CO., 11 Broadway, New York, N. Y...*pp. 546, 547*
*LAMMERT & MANN CO., Wood & Walnut Sts., Chicago, Ill...*p. 561*
Piqua Blower Co. (''Piqua''), Piqua, Ohio
*ROCKWELL, W. S. CO., 50 Church St., New York, N. Y...*p. 529*
SPENCER TURBINE CO., Hartford, Conn. *p. 552*
STURTEVANT, B. F. CO., Hyde Park, Boston, Mass...*p. 106*
*TERRY STEAM TURBINE CO., Hartford, Conn...*pp. 26, 27*
WILBRAHAM-GREEN BLOWER CO., Pottstown, Pa...*p. 559*

—Rotary
BEACH-RUSS CO., 50 Church St., New York, N. Y...*p. 560*
Buffalo Dental Mfg. Co., 587-589 Main St., Buffalo, N. Y.
Connersville Blower Co., Connersville, Ind.
Leiman Bros., 81 Walker St., New York, N. Y.
Piqua Blower Co. (''Piqua''), Piqua, O.
Roots, P. H. & F. M. Co., Connersville, Ind.
*WESTINGHOUSE ELECTRIC & MFG. CO., East Pittsburgh, Pa...*pp. 160, 161*
WILBRAHAM-GREEN BLOWER CO., Pottstown, Pa...*p. 559*

—Soot
*BAYER STEAM SOOT BLOWER CO., 4056 Park Ave., St. Louis, Mo...*p. 110*
Chaflin, Chas. A. & Co., 161 High St., Boston, Mass.
Diamond Power Specialty Co., 956 Oakland Ave., Detroit, Mich.
General Specialty Co., 61-69 Carroll Street, Buffalo, N. Y.
Hafer Foundry & Machine Works, Chambersburg, Pa.
Monarch Soot Remover Co. (Inc.), 261 Franklin St., Boston, Mass.
Sherwood Mfg. Co., 702-412 Elmwood Ave., Buffalo, N. Y.
Vulcan Soot Cleaner Co. (''Vulcan''), Du Bois, Pa.

—Steam (Ring Type)
McCLAVE-BROOKS CO., Scranton, Pa...*p. 126*

—Steam Jet
Coe, C. T. Co., 10-14 Johnson St., Newark, N. J.
Eynon-Evans Corpn., 15th & Clearfield Sts., Philadelphia, Pa.
Parsons Mfg. Co., P. O. Box 212, Elizabeth, N. J.
Power Engineering Co., Railway Exchange, Chicago, Ill.
Sauer Power Generating Co., 5115 Rosetta St., Pittsburgh, Pa.
*SCHUTTE & KOERTING CO., 1184 Thompson St., Philadelphia, Pa...*p. 159*

—Turbine
Carling Turbine Blower Co .(Inc.), Worcester, Mass.

Digitized by Google

Coe, C. T. Co., 10-14 Johnson St., Newark, N. J.
COPPUS ENGINEERING & EQUIPMENT CO., 342-348 Park Ave., Worcester, Mass. ..*pp. 104, 105*
*GREEN FUEL ECONOMIZER CO., Beacon, N. Y...*pp. 96, 97*
*KERR TURBINE CO., Wellsville, N. Y... *p. 23*
SPENCER TURBINE CO., Hartford, Conn. ..*p. 552*
STURTEVANT, B. F. CO., Hyde Park, Boston, Mass...*p. 106*
*TERRY STEAM TURBINE CO., Hartford, Conn...*pp. 26, 27*

BLOWPIPES
AMERICAN GAS FURNACE CO., Elizabeth, N. J...*p. 527*
National Blow Pipe & Mfg. Co., 738 Dryades St., New Orleans, La.
Northern Blower Co., West 65th & Dennison Ave., Cleveland, Ohio

—Brazing
AMERICAN GAS FURNACE CO., Elizabeth, N. J...*p. 527*
Buffalo Dental Mfg. Co., 587-589 Main St., Buffalo, N. Y.

—Cutting
Delcamp Welding Co., Bridgeport, Conn.

—Welding
Delcampe Welding Co., Bridgeport, Conn.
Oxy-Carbi Co., New Haven, Conn.
Waterhouse Welding Co., 15 Pelham St., Boston, Mass.

—Welding and Cutting
MILBURN, ALEXANDER CO. (The), Baltimore, Md...*p. 540*

BLUE PRINT PAPER AND CLOTH
Cole, H. Co., 68 E. Gay St., Columbus, Ohio
Kolesch & Co., 138 Fulton St., New York, N. Y.
Defiance Mfg. Co., 22 E. 41st St., New York, N. Y.
Makepeace, B. L. (Inc.), 387 Washington St., Boston, Mass.
New York Blue Print Paper Co., 102 Reade St., New York, N. Y.
PEASE, C. F. CO., 843 N. Franklin St., Chicago, Ill...*p. 664*
Post, Frederick Co., 3635 N. Hamlin Ave., Chicago, Ill.
Soltmann, E. G. (Inc.), 202 E. 42nd St., New York, N. Y.
Special Fabrics Co., Saylesville, R. I.
United States Blue Print Paper Co. ("Triumph"), 201-207 S. Wabash Ave., Chicago, Ill.
Weil, J. H. & Co., 1300 Arch St., Philadelphia, Pa.

BLUE PRINTING MACHINES
Paragon Machine Co., 11 South Ave., Rochester, N. Y.
PEASE, C. F. CO., 843 N. Franklin St., Chicago, Ill...*p. 664*
Revolute Machine Co., 417 E. 93rd St., New York, N. Y.
Wagenhorst, J. H. & Co., 512 Andrews Ave., Youngstown, Ohio
Williams, Brown & Earle, Inc., 918 Chestnut St., Philadelphia, Pa.

BLUING (Metal)
*AMERICAN METAL TREATMENT CO., Elizabeth, N. J...*p. 535*

BOILER ARCHES, BAFFLES, COMPOUND, COVERINGS, FEEDERS, FURNACES, TUBES, ETC.
(See Arches, Baffles, Compounds Coverings, Feeders, Furnaces, Tubes, etc., Boiler)

BOILER BRACES
Ryderson, Joseph T. & Son, 16th & Rockwell Sts., Chicago, Ill.
Scully Steel & Iron Co., P. O. Box 814, Chicago, Ill.

BOILER CLEANING SYSTEMS
National Boiler Specialties Co., Elgin, Ill.

BOILER FEED WATER TREATMENT
Bird-Archer Co., 90 West St., New York, N. Y.
Champion Compound Co., 28 South Delaware Ave., Philadelphia, Pa.
Crown Mfg. Co., Cleveland, Ohio.
Eagle Oil & Supply Co., ("Perolin") 44-45-46 India St., Boston, Mass.
Ferrochem Co., Ltd., 30 Church St., New York, N. Y.
HAYS, JOS. W. CORP'N, ("Spitzerinktum"), Michigan City, Ind...*p. 282*
International Boiler Cleaning Co., 341-343 Calvert St., Baltimore, Md.
International Boiler Compound Co., 140-142 W. Austin Ave., Chicago, Ill.
National Boiler Specialties Co., Elgin, Ill.
Paige & Jones Chemical Co., 15 E. 40th St., New York, N. Y.
Perolin Co., of America, 2010 People's Gas Bldg., Chicago, Ill.
Unisol Mfg. Co., Jersey City, N. J.

BOILER FRONTS
BASS FOUNDRY & MACHINE CO., Fort Wayne, Ind...*p. 57*
*BIGELOW CO., 76 River St., New Haven, Conn. ..*p. 58*
BROWNELL CO., Dayton, Ohio...*p. 59*
BUDD GRATE CO., 2013 E. Letterly St., Philadelphia, Pa...*p. 123*
*CASEY-HEDGES CO., Chattanooga, Tenn... *pp. 60, 61*
Chicago Tile Arch Furnace Co., 2600-10 W. Grand Ave., Chicago, Ill.
*COLE, R. D. MFG. CO., Newman, Ga...*p. 63*
Kelly Foundry & Machine Co., E. Purl St., Goshen, Ind.
MURRAY IRON WORKS CO., Burlington, Iowa...*pp. 80, 81*
Myerstown Foundry & Mfg. Co. (Inc.), 90 West St., New York, N. Y.
Pennsylvania Boiler Works, 12th & Penna. Ave., Erie, Pa.
*TITUSVILLE IRON WORKS CO., Titusville, Pa...*p. 89*
*VOGT, HENRY MACHINE CO., Louisville, Ky...*pp 632, 633*
*WALSH & WEIDNER BOILER CO., Chattanooga, Tenn...*p. 91*
*WASHBURN & GRANGER (INC.), 50 Church St., New York, N. Y...*p. 127*

BOILER HEADS
LASKER IRON WORKS, 3201 So. Lincoln St., Chicago, Ill...*p. 655*
Central Iron & Steel Co., Front & Dock Sts., Harrisburg, Pa.
GLASGOW IRON CO., Pottstown, Pa...*p. 99*
Lukens Steel Co., Coatesville, Pa.
McAleenan Bros. Co., 25th & R. R. Sts., Pittsburgh, Pa.
Standard Boiler & Plate Iron Co., Niles, Ohio

BOILER SADDLES (Pressed Steel)
GLASGOW IRON CO., Pottstown, Pa...*p. 99*
Lukens Steel Co., Coatesville, Pa.
*TITUSVILLE IRON WORKS CO., Titusville, Pa... *p. 89*

BOILER SETTINGS
Betson Plastic Fire Brick Co. (Inc.), Box 368-A, Rome, N. Y.
Borge Incinerator Corp'n., 1216 Flatiron Bldg., New York, N. Y.
*CRESCENT REFRACTORIES CO., Curwensville, Clearfield County, Pa...*p. 136*
Heinicke, H. R. (Inc.), 147 Fourth Ave., New York, N. Y.

Digitized by Google

*KEELER, E. CO., Williamsport, Pa...*p. 69*
McLeod & Henry Co. ("Steel Mixture"), Troy, N. Y.
Rust Engineering Co., 504 District National Bank Bldg., Washington, D. C.
*WICKES BOILER CO., Saginaw, Mich...*p. ..93*
Woolson, O. C. Son, 39 Cortlandt St., New York, N. Y.

—Steel Cased

BROWNELL CO., Dayton, Ohio..*p. 59*
*CASEY-HEDGES CO., Chattanooga, Tenn...*pp. 60, 61*
*VOGT, HENRY MACHINE CO., Louisville, Ky...*pp. 632, 633*
*WICKES BOILER CO., Saginaw, Mich...*p. 93*
*WALSH & WEIDNER BOILER CO., Chattanooga, Tenn...*p. 91*

BOILER SKIMMERS

Buckeye Boiler Skimmer Co., Water Works Drive, Toledo, Ohio
National Boiler Specialties Co., Elgin, Ill.
*YARNALL-WARING CO. ("Yarway"), 7603-20 Queen St., Chestnut Hill, Philadelphia, Pa...*p. 196*

BOILER WASHING AND FILLING SYSTEMS (Locomotive)

NATIONAL BOILER WASHING CO. ("National"), Railway Exchange, Chicago, Ill...*p. 145*

BOILER WASHING EQUIPMENT (Locomotive)

Rue Mfg. Co., 228 Cherry St., Philadelphia, Pa.

BOILERS

—Heating

*BIGELOW CO., 76 River St., New Haven, Conn...*p. 58*
BROWNELL CO., Dayton, Ohio..*p. 59*
Bryant Heater & Mfg. Co., 952 East 72nd St., Cleveland, Ohio
Burnham Boiler Corp'n ("Burnham"), Irvington, N. Y.
*CASEY-HEDGES CO., Chattanooga, Tenn...*pp. 60, 61*
CLOW, JAMES B. & SONS ("Triumph"), 534 So. Franklin St., Chicago, Ill...*pp. 330, 331*
Eclipse Fuel Engrg. Co., Rockford, Ill.
*ERIE CITY IRON WORKS, Erie, Pa...*pp. 66, 67*
Fitzgibbons Boiler Co., 17 Battery Place, New York, N. Y.
Gorton & Lidgerwood Co., 96 Liberty St., New York, N. Y.
Gurney Heater Mfg. Co., 188-200 Franklin St., Boston, Mass.
Heath Grate Bar Co., 12 Pearl St., Boston, Mass.
Herbert Boiler Co., Root & Lasalle Sts., Chicago, Ill.
Hitchings & Co., Elizabeth, N. J.
Hudson Boiler Mfg. Co., 359 W. 42nd St., New York
Ideal Heating Co., 915 Gates Ave., Brooklyn, N. Y.
ILLINOIS MALLEABLE IRON CO. ("Imico, Illinois"), 1801-25 Diversey Parkway, Chicago, Ill...*p. 241*
*KEELER, E. CO., Williamsport, Pa...p. 69
KEWANEE BOILER CO., Kewanee, Ill...*pp. 622, 623, 624*
KROESCHELL BROS. CO., 460 West Erie St., Chicago, Ill...*p. 75*
*LEFFEL, JAMES & CO., Springfield, Ohio..*p. 33*
Macbeth Boiler Co., 1240 W. 4th St., Cleveland, Ohio
MURRAY IRON WORKS CO., Burlington, Iowa..*pp. 80, 81*
Nagle Engine & Boiler Works, 234 E. 16th St., Erie, Pa.
OIL CITY BOILER WORKS ("Oil City"), Oil City, Pa...*p. 16*
OLMSTEAD, A. E. & SONS, Pulaski, N. Y...*p. 50*
PIERCE, BUTLER & PIERCE MFG. CORP'N, 437 East 162nd St., New York, N. Y...*p. 204*
Richardson & Boynton Co., 260 Fifth Ave., New York, N. Y.
SIMS CO., Erie, Pa...*p. 152*
*SMITH, H. B. CO., Westfield, Mass...*pp. 626, 627*
*TITUSVILLE IRON WORKS CO. ("Acme" "Tico" "Perfection"), Titusville, Pa...*p. 89*
United States Radiator Corp'n, ("Capitol"), 35 E. Grande River Ave., Detroit, Mich.
*WALSH & WEIDNER BOILER CO., Chattanooga, Tenn...*p. 91*

—High Pressure

*BABCOCK & WILCOX CO., ("B & W" "Stirling"), 85 Liberty St., New York, N. Y...*pp. 52, 53, 54, 55*
BADENHAUSEN, PHILLIPS, ("Badenhausen"), 1425 Chestnut Street, Philadelphia, Pa...*p. 56*
*BIGELOW CO., 76 River St., New Haven, Conn...*p. 58*
BROWNELL CO., Dayton, Ohio..*p. 59*
Burnham Boiler Corp'n, Irvington, N. Y.
*CASEY-HEDGES CO., Chattanooga, Tenn...*pp. 60, 61*
*COLE, R. D. MFG. CO., Newnan, Pa...*p. 63*
*EDGE MOOR IRON CO., Edge Moor, Del...*p. 65*
Fitzgibbons Boiler Co., 17 Battery Place, New York, N. Y.
Godfrey, Keeler Co., 70 Warren St., New York, N. Y.
Granger, A. D. Co., 15 Park Row, New York, N. Y.
*HEINE BOILER CO. ("Heine"), St. Louis, Mo...*pp. 70, 71*
Inglis Co., (Ltd.), Toronto, Ont., Canada.
INTERNATIONAL ENGINEERING WORKS (Inc.), Framingham, Mass...*pp. 72, 33*
*KEELER, E. CO., Williamsport, Pa...*p. 69*
KEWANEE BOILER CO., Kewanee, Ill...*pp. 622, 623, 624*
KROESCHELL BROS. CO., 460 West Erie St., Chicago, Ill...*p. 75*
*LADD, GEORGE T. CO., First Nat'l. Bank Bldg., Pittsburgh, Pa...*pp. 76, 77*
LASKER IRON WORKS, 3201 So. Lincoln St., Chicago, Ill...*p. 655*
*LEFFEL, JAMES & CO., Springfield, Ohio..*p. 33*
MURRAY IRON WORKS CO., Burlington, Iowa..*pp. 80, 81*
NEWBURGH STEAM BOILER WORKS, (P. Delany & Co.), Newburgh, N. Y...*p. 64*
OLMSTEAD, A. E. & SONS, Pulaski, N. Y...*p. 50*
Oswego Boiler & Engine Co., Oswego, N. Y.
Pardel Corp'n, Sheridan Bldg., 9th & Sansom Sts., Philadelphia, Pa.
SMITH, SAMUEL & SON CO., Paterson, N. J...*p. 88*
*SPRINGFIELD BOILER CO., Springfield, Ill...*pp. 86, 87*
*TITUSVILLE IRON WORKS CO., ("Tico" "Perfection"), Titusville, Pa...*p. 89*
*UNION IRON WORKS, ("Union"), Erie, Pa...*p. 90*
Unit Railway Car Co., 32 Alger St., So. Boston, Mass.
*WALSH & WEIDNER BOILER CO., Chattanooga, Tenn...*p. 91*
Winslow Boiler & Engrg Co., 1428 McCormick Bldg., Chicago, Ill.

Digitized by Google

Worthington Water Tube Boiler Co., 36 Warren St., New York, N. Y.

—Internal Furnace

Acme Boiler & Tank Co., 48th & Morgan Sts., Chicago, Ill.
AMES IRON WORKS, Oswego, N. Y...*p. 4*
BADENHAUSEN, PHILLIPS, 1425 Chestnut Street Philadelphia, Pa...*p. 56*
Borger Bros. Boiler Works, 257 W. Spring St., Columbus, Ohio
BROWNELL CO., Dayton, Ohio..*p. 59*
*CASEY-HEDGES CO., Chattanooga, Tenn... *pp. 60, 61*
Davis, J. F. & Sons Co., 111 West Monroe St., Chicago, Ill.
Freeman, S. & Sons Mfg. Co., Racine, Wis.
Godfrey, Keeler Co., 70 Warren St., New York
INTERNATIONAL ENGINEERING WORKS (Inc.), Framingham, Mass...*pp. 72, 73*
La Crosse Boiler Co., La Crosse, Wis.
*LEFFEL, JAMES & CO., Springfield, Ohio.. *p. 33*
Mack Bros. Boiler & Sheet Iron Works Co., (Inc.), Syracuse, N. Y.
MURRAY IRON WORKS CO., Burlington, Iowa..*pp. 80, 81*
NEUBURGH STEAM BOILER WORKS. (P. Delany & Co.), Newburgh, N. Y...*p. 64*
Ocean Shore Iron Works, 550 8th St., San Francisco, Cal.
Pennsylvania Boiler Works, 12th & Penna. Ave., Erie, Pa.
*TITUSVILLE IRON WORKS CO., Titusville, Pa...*p. 89*
*WALSH & WEIDNER BOILER CO., Chattanooga, Tenn...*p. 91*

—Locomotive

AMES IRON WORKS, Oswego, N. Y...*p. 4*
Brennan, John & Co., 24th St. & M. C. R. R., Detroit, Mich.
FROST MFG. CO., 112 W. Adams St., Chicago, Ill...*pp. 68, 634*
Godfrey, Keeler Co., 70 Warren St., New York, N. Y.
International Boiler Works., East Stroudsburg, Pa.
KEWANEE BOILER CO., Kewanee, Ill... *pp. 622, 623, 624*
*LEFFEL, JAMES & CO., Springfield, Ohio. ..*p. 33*
Leonard, E. & Sons (Ltd.) London, Canada.
Manitowoc Boiler Works Co., Manitowoc, Wis.
MURRAY IRON WORKS CO., Burlington, Iowa...*pp. 80, 81*
Nagle Engine & Boiler Works, 234 E. 16th St., Erie, Pa.
NEWBURGH STEAM BOILER WORKS, (P. Delany & Co.) Newburgh, N. Y...*p. 64*
Orr & Sembower, (Inc.) Reading, Pa.
Pennsylvania Boiler Works, 12th & Penna. Ave., Erie, Pa.
SMITH, SAMUEL & SON CO., Paterson, N. J...*p. 88*
*TITUSVILLE IRON WORKS CO., Titusville, Pa...*p. 89*
*WALSH & WEIDNER BOILER CO., Chattanooga, Tenn...*p. 91*
Wood, William H., Media, Pa.

—Marine

Almy Water Tube Boiler Co., 178 Allens Ave., Providence, R. I.
American Condenser & Engineering Corp'n, 120 Broadway, New York, N. Y
*BABCOCK & WILCOX CO., 85 Liberty St., New York, N. Y...*pp. 52, 53, 54, 55*
Babcock & Wilcox (Ltd.) College St., St. Henry, Montreal, Canada.
BADENHAUSEN, PHILLIPS ("Badenhausen") 1425 Chestnut St., Philadelphia, Pa...*p. 56*
Beggs, James & Co., 36 Warren St., New York, N. Y.
Bethlehem Shipbuilding Corpn. (Ltd.), Bethlehem, Pa.
*BIGELOW CO., 76 River St., New Haven, Conn...*p. 58*
Boston Engineering Co., India Wharf, Boston, Mass.
*CASEY-HEDGES CO., Chattanooga, Tenn. ..*pp. 60, 61*
Charleston Dry Dock & Machine Co., East End Calhoun St., Charleston, S. C.
Connelly, D. Boiler Co., Ivanhoe Road, Cleveland, Ohio.
Fitzgibbons Boiler Co., 17 Battery Place, New York, N. Y.
Foster Marine Boiler Co., 111 Broadway, New York, N. Y.
*HEINE BOILER CO., ("Heine") St. Louis, Mo...*pp. 70, 71*
Hodge Boiler Works, 99 Summer St., East Boston Mass.
International Boiler Works Co., East Stroudsburg, Pa.
INTERNATIONAL ENGINEERING WORKS (Inc.) Framingham, Mass...*pp. 72, 73*
Kingsford Foundry & Machine Works, Oswego, N. Y.
La Crosse Boiler Co., La Crosse, Wis.
LASKER IRON WORKS, 3201 So. Lincoln St. Chicago, Ill...*p. 655*
Mack Bros. Boiler & Sheet Iron Works Co., (Inc.), Syracuse, N. Y.
Manitowoc Boiler Works Co., Manitowoc, Wis.
MURRAY IRON WORKS CO., Burlington, Iowa...*pp 80, 81*
NEWBURGH STEAM BOILER WORKS, (P. Delany & Co.), Newburgh, N. Y... *p. 64*
NEW YORK ENGINEERING CO., 2 Rector St., New York, N. Y...*p. 82*
Pennsylvania Boiler Works, 12th & Penna. Ave., Erie, Pa.
Rees, James & Sons Co., Pittsburgh, Pa.
Roberts Safety Water Tube Boiler Co., 102-118 Chestnut St., Redbank, N. J.
*SPRINGFIELD BOILER CO., Springfield, Ill...*pp. 86, 87*
*TITUSVILLE IRON WORKS CO., Titusville, Pa...*p. 89*
*WALSH & WEIDNER BOILER CO., Chattanooga, Tenn...*p. 91*
*WARD, CHARLES ENGINEERING WORKS ("Ward"), Charleston, W. Va...*p. 92*
*WICKES BOILER CO., ("Wickes"), Saginaw, Mich...*p. 93*
Worthington Water Tube Co., 36 Warren St., New York, N. Y.

—Oil Burning

Almy Water Tube Boiler Co., 178 Allens Ave, Providence, R. I.
*BABCOCK & WILCOX CO., 85 Liberty St., New York, N. Y...*pp. 52, 53, 54, 55*
*BIGELOW CO., 76 River St., New Haven, Conn...*p. 58*
*TITUSVILLE IRON WORKS CO., Titusville, Pa...*p. 89*
*SPRINGFIELD BOILER CO., Springfield, Ill...*pp. 86, 87*
*WALSH & WEIDNER BOILER CO., Chattanooga, Tenn...*p. 91*

—Portable

AMES IRON WORKS, Oswego, N. Y....*p. 4*
BROWNELL CO., Dayton Ohio..*p. 59*
*CASEY-HEDGES CO., Chattanooga, Tenn. ..*pp. 60, 61*
*ERIE CITY IRON WORKS, ("Economic"), Erie, Pa...*pp. 66, 67*
FARRAR & TREFTS, Buffalo, N. Y...*p. 652*
Farquhar, A. B. Co., Ltd., York, Pa.

Digitized by Google

Godfrey, Keeler Co., 70 Warren St., New York, N. Y.
*KEELER, E. CO., Williamsport, Pa...*p. 69*
KEWANEE BOILER CO., Kewanee, Ill...*pp. 622, 623, 624*
KROESCHELL BROS. CO., 460 West Erie St., Chicago, Ill...*p. 75*
LEFFEL, JAMES & CO., Springfield, Ohio...*p. 33*
*LIDGERWOOD MFG. CO., 96 Liberty St., New York, N. Y...*p. 388*
Nagle Engine & Boiler Works, 234 E. 16th St., Erie, Pa.
NATIONAL SUPPLY CO., Toledo, Ohio...*pp. 648, 649*
Pennsylvania Boiler Works, 12th & Penna. Ave., Erie, Pa.
*TITUSVILLE IRON WORKS CO. ("Tico") Titusville, Pa...*p. 89*
*WALSH & WEIDNER BOILER CO., Chattanooga, Tenn...*p. 91*

—Return Tubular

Akerlund & Semmes, (Inc.), 17 Battery Place, New York, N. Y.
AMES IRON WORKS, Oswego, N. Y...*p. 4*
BASS FOUNDRY & MACHINE CO., Fort Wayne, Ind...*p. 57*
*BIGELOW CO., ("Bigelow"), 76 River St., New Haven, Conn...*p. 58*
Borger Bros. Boiler Works, 257 W. Spring St., Columbus, Ohio.
Bros. Wm. Boiler & Mfg. Co., Minneapolis, Minn.
BROWNELL CO., Dayton, Ohio...*p. 59*
*CASEY-HEDGES CO., Chattanooga, Tenn...*pp. 60, 61*
Chandler & Taylor Co., Indianapolis, Ind.
Charleston Dry Dock & Machine Co., East End Calhoun St., Charleston S. C.
COATESVILLE BOILER WORKS, Coatesville, Pa...*p. 62*
*COLE, R. D. MFG. CO., Newnan, Ga...p. 63
Connelly, D. Boiler Co., Ivanhoe Road, Cleveland, Ohio.
Davis, J. F. & Sons Co., 111 West Monroe St., Chicago, Ill.
Dillon, D. M. Steam Boiler Works, Fitchburg, Mass.
Downingtown Iron Works, (Inc.), Downingtown, Pa.
Dutton, C. H. Co., Kalamazoo, Mich.
ERIE ENGINE WORKS, Erie, Pa...*p. 8*
ERIE CITY IRON WORKS, Erie, Pa...*pp. 66, 67*
Freeman, S. & Sons Mfg. Co., Racine, Wis.
FROST MFG. CO., 112 W. Adams St., Chicago, Ill...*pp. 68, 634*
Godfrey, Keeler Co., 70 Warren St., New York, N. Y.
Granger, A. D. Co., 15 Park Row, New York, N. Y.
Grupe Drier & Boiler Co., 325-331 E. Second St., Davenport, Ia.
Herbert Boiler Co., Root & La Salle Sts, Chicago, Ill.
Hodge Boiler Works, 99 Sumner St., East Boston, Mass.
Houston, Stanwood & Gamble Co., Cincinnati, Ohio.
INTERNATIONAL ENGINEERING WORKS, (Inc.), Framingham, Mass...*pp. 72, 73*
*KEELER, E. CO., Williamsport, Pa...*p. 69*
KEWANEE BOILER CO., Kewanee, Ill...*pp. 622 623, 624*
KROESCHELL BROS. CO., 460 West Erie St., Chicago, Ill...*p. 75*
La Crosse Boiler Co., La Crosse, Wis.
LEBANON BOILER WORKS, (J. K. Petty & Co., Inc.), 6 So. 15th St., Philadelphia, Pa...*pp. 78, 79*
Leonard, E. & Sons (Ltd.), London, Canada.
Leslie & Elliott Co., Cor. E. Railway & Iowa Aves., Patterson, N. J.
*LIDGERWOOD MFG. CO., 96 Liberty St., New York, N. Y...*p. 388*
Lookout Boiler & Mfg. Co., Chattanooga, Tenn.
Lucy Mfg. Corp'n, Woolworth Bldg., New York, N. Y.
McDermott Engineering Co., Whitehall & Jordan Sts., Allentown, Pa.
McEwen Brothers, Wellsville, N. Y.
Machold & Riddell, 1020 Stephen Girard Bldg., Philadelphia, Pa.
Mack Bros. Boiler & Sheet Iron Works Co., (Inc.), Syracuse, N. Y.
Michelmann Steel Construction Co., 121-141 N. Second St., Quincy, Ill.
Milwaukee Boiler Mfg. Co., 35th & National Aves., Milwaukee, Wis.
Munroe, R. & Sons, 23rd & Smallman Sts., Pittsburgh, Pa.
Murphy, John H. Iron Works, Magazine & Girod Sts., New Orleans, La.
MURRAY IRON WORKS CO., Burlington, Iowa...*pp. 80, 81*
Muskegon Boiler Works, 18-22 8th St., Muskegon, Mich.
Nagle Engine & Boiler Works, 234 E. 16th St., Erie, Pa.
NEWBURGH STEAM BOILER WORKS, (P. Delany & Co.), Newburgh, N. Y...*p. 64*
*O'BRIEN, JOHN BOILER WORKS CO., St. Louis, Mo...*p. 83*
Ocean Shore Iron Works, 550 8th St., San Francisco, Cal.
OIL CITY BOILER WORKS, Oil City, Pa...*p. 84*
Oswego Boiler & Engine Co., Oswego N. Y.
Pennsylvania Boiler Works, 12th & Penna. Ave., Erie, Pa.
Randle Machinery Co., Cincinnati, Ohio.
Ruemmeli-Dawley Mfg. Co., 3900 Chouteau Ave., St. Louis, Mo.
SMITH, SAMUEL & SON CO., Patterson, N. J...*p. 88*
Southern Engine & Boiler Works, Jackson, Tenn.
Star Boiler Works, Clinton, Ia.
Stewart Boiler Works, Albany St., Worcester, Mass.
*TITUSVILLE IRON WORKS CO., Titusville, Pa...*p. 89*
Tri-State Engrg. Co., 130-46 S. 5th St., Zanesville, Ohio.
Tudor Boiler Mfg. Co., 715 E. Third St., Cincinnati, Ohio.
UNION IRON WORKS, Erie, Pa...*p. 90*
Union Iron Works Co., Selma, Ala.
*VOGT, HENRY MACHINE CO., Louisville, Ky...*pp. 632, 633*
*WALSH & WEIDNER CO., Chattanooga, Tenn...*p. 91*
Walton, C. & Son, 1221 W. Main St., Louisville, Ky.
Wholey Boiler Works, 95 Whipple St., Providence, R. I.
*WICKES BOILER CO., Saginaw, Mich...*p. 93*
Wilson, W. A. Machine Co., 217 N. Water St., Rochester, N. Y.

—Scotch Marine

Brennan, John & Co., 24th St. & M. C. R. R., Detroit, Mich.
BROWNELL CO., Dayton, Ohio...*p. 59*
Dillon, D. M. Steam Boiler Works, Fitchburg, Mass.
Granger, A. D. Co., 15 Park Row, New York, N. Y.
INTERNATIONAL ENGINEERING WORKS, (Inc.) ("Brady"), Framingham, Mass...*pp. 72, 73*

Digitized by Google

LASKER IRON WORKS, 3201 So. Lincoln St., Chicago, Ill...*p. 655*
*LEFFEL, JAMES & CO., Springfield, Ohio. ..*p. 33*
NEWBURGH STEAM BOILER WORKS, (P. Delany & Co.), Newburgh, N. Y... *p. 64*
Oswego Boiler & Engine Co., Oswego, N. Y.
Ruemmeli-Dawley Mfg. Co., 3900 Chouteau Ave., St. Louis, Mo.
Sun Shipbuilding Co., Chester, Pa.
*TITUSVILLE IRON WORKS CO., Titusville, Pa...*p. 89*
*WALSH & WEIDNER BOILER CO., Chattanooga, Tenn...*p. 91*

—Vertical Tubular

AMES IRON WORKS, Oswego, N. Y...*p. 4*
*BIGELOW CO., (''Manning''), 76 River St., New Haven, Conn...*p. 58*
BROWNELL CO., Dayton, Ohio...*p. 59*
CASEY-HEDGES CO., Chattanooga, Tenn. ..pp. 60, 61
COATESVILLE BOILER WORKS, Coatesville, Pa...*p. 62*
*COLE, R. D. MFG. CO., Newnan, Ga... *p. 63*
Dillon, D. M. Steam Boiler Works, Fitchburg, Mass.
Dutton, C. H. Co., Kalamazoo, Mich.
FROST MFG. CO., 112 W. Adams St., Chicago, Ill...*pp. 68, 634*
Godfrey, Keeler Co., 70 Warren St., New York, N. Y.
International Boiler Works Co., East Stroudsburg, Pa.
INTERNATIONAL ENGINEERING WORKS, (Inc.) (''Manning''), Framingham, Mass. ..*pp. 72, 73*
KEWANEE BOILER CO., Kewanee, Ill... *pp. 622, 623, 624*
KROESCHELL BROS. CO., 460 West Erie St., Chicago, Ill...*p. 75*
LASKER IRON WORKS, 3201 So. Lincoln St., Chicago, Ill...*p. 655*
LEBANON BOILER WORKS, (J. K. Petty & Co., Inc.), 6 So. 15th St., Philadelphia, Pa...*pp. 78, 79*
*LEFFEL, JAMES & CO., Springfield, Ohio. ..*p. 32*
*LIDGERWOOD MFG. CO., 96 Liberty St., New York, N. Y...*p. 388*
MILWAUKEE RELIANCE BOILER WORKS (''Reliance''), Milwaukee, Wis...*p. 148*
MURRAY IRON WORKS CO., Burlington, Iowa...*pp. 80, 81*
Nagle Engine & Boiler Works, 234 E. 16th St., Erie, Pa.
NEWBURGH STEAM BOILER WORKS, (P. Delany & Co.), Newburgh, N. Y... *p. 64*
Ocean Shore Works, 550 8th St., San Francisco, Cal.
OIL CITY BOILER WORKS, Oil City, Pa. ..*p. 84*
Orr & Sembower, (Inc.), Reading, Pa.
SMITH, SAMUEL & SON CO., Paterson, N. J...*p. 88*
Stewart Boiler Works, Albany St., Worcester, Mass.
*TITUSVILLE IRON WORKS CO., Titusville, Pa...*p. 89*
UNION IRON WORKS, Erie, Pa...*p. 90*
*WALSH & WEIDNER BOILER CO., Chattanooga, Tenn...*p. 91*

—Water Tube

Abendroth & Root Mfg. Co., 45 Broadway, New York, N. Y.
Almy Water Tube Boiler Co., 178 Allens Ave., Providence, R. I.
American Condenser & Engineering Corp'n, 120 Broadway, New York, N. Y.
*BABCOCK & WILCOX CO., (''B & W'') (''Sterling'') 85 Liberty St., New York, N. Y...*pp. 52, 53, 54, 55*
Babcock & Wilcox, (Ltd.), College St., St. Henry, Montreal, Canada.
BADENHAUSEN, PHILLIPS (''Badenhausen''), 1425 Chestnut St., Philadelphia, Pa. *p. 56*
BASS FOUNDRY & MACHINE CO., Fort Wayne, Ind...*p. 57*
Beggs, James & Co., 36 Warren St., New York, N. Y.
*BIGELOW CO.. (''Bigelow-Hornsby'') 76 River St., New Haven, Conn...*p. 58*
Brennan, John & Co., 24th St., & M. C. R. R., Detroit, Mich.
*CASEY HEDGES CO., Chattanooga, Tenn... *pp. 60, 61*
Connelly, . Boiler Co., Ivanhoe Road, Cleveland, Ohio.
Cunningham, Christopher Co., 894 Greenpoint Ave. & Newton Creek, Brooklyn, N. Y.
Davis, J. F. & Sons Co., 111 West Monroe St., Chicago, Ill.
*EDGE MOOR IRON CO., Edge Moor, Del... *p. 65*
*ERIE CITY IRON WORKS, Erie, Pa... *pp. 66, 67*
Flanner Boiler Co., Akron, Ohio.
Foster Marine Boiler Co., 111 Broadway, New York, N. Y.
Freeman, S. & Sons Mfg. Co., Racine, Wis.
FROST MFG. CO., 112 W. Adams St., Chicago, Ill...*pp. 68, 634*
Goldie & McCulloch Co., (Ltd.), Galt, Ont., Canada.
*HEINE BOILER CO., (''Heine''), St. Louis, Mo...*pp 70, 71*
INTERNATIONAL ENGINEERING WORKS, (Inc.), Framingham, Mass...*pp. 72, 73*
KEELER & CO., Williamsport, Pa...*p. 69*
KIDWELL BOILER & ENGINEERING CO., 288 East Water Street, Milwaukee, Wis... *p. 74*
Kingsford Foundry & Machine Works, Oswego, N. Y.
KROESCHELL BROS. CO., 460 West Erie St., Chicago, Ill...*p. 75*
*LADD, GEORGE T. CO., (''Ladd''), First National Bank Bldg., Pittsburgh, Pa... *pp. 76, 77*
LASKER IRON WORKS, 3201 So. Lincoln St. Chicago, Ill...*p. 655*
Leonard, E. & Sons (Ltd.), London, Canada.
Llewellyn Iron Works, Los Angeles, Cal.
Lombard Iron Works & Supply Co., Augusta, Ga.
McNaull Boiler Mfg. Co., Toledo, Ohio.
Manitowoc Boiler Works Co., Manitowoc, Wis.
Munroe, R. & Sons, 23rd & Smallman Sts., Pittsburgh, Pa.
MURRAY IRON WORKS CO., Burlington, Iowa...*pp. 80, 81*
Nagle Engine & Boiler Works, 234 E. 16th St., Erie, Pa.
NEW YORK ENGINEERING CO., 2 Rector St., New York, N. Y...*p. 82*
*O'BRIEN, JOHN BOILER WORKS CO., St. Louis, Mo...*p. 83*
Ocean Shore Iron Works, 550 8th St., San Francisco, Cal.
OIL CITY BOILER WORKS, (''Oil City''), Oil City, Pa...*p. 84*
OLMSTEAD, A. E. & SONS, Pulaski, N. Y. ..*p. 50*
PAGE BOILER CO., 817 Larrabee St., Chicago, Ill...*p. 85*
Prospect Boiler Co., Ward St. & Raritan River R. R., New Brunswick, N. J.
Roberts Safety Water Tube Boiler Co., 102-118 Chestnut St., Redbank, N. J.
Ruemmeli-Dawley Mfg. Co., 3900 Chouteau Ave., St. Louis, Mo.

Bo

Digitized by Google

Schofield's, J. S. Sons Co., Macon, Ga.
*SMITH, H. B. CO., Westfield, Mass...*pp. 626, 627*
*SPRINGFIELD BOILER CO., (''Springfield-Sectional''), Springfield, Ill...*pp. 86, 87*
Stirling, Allan, 878 Drexel Bldg., Philadelphia, Pa.
*UNION IRON WORKS (''Union'') Erie, Pa...*p. 90*
*VOGT, HENRY MACHINE CO., Louisville, Ky...*pp. 632, 633*
*WALSH & WEIDNER BOILER CO., Chattanooga, Tenn...*p. 91*
*WARD, CHARLES ENGINEERING WORKS (''Ward''), Charleston, W. Va...*p. 92*
*WICKES BOILER CO., (''Wickes''), Saginaw, Mich...*p. 93*
Winslow Boiler & Engrg. Co., 1423 McCormick Bldg., Chicago, Ill.
Worthington Water Tube Boiler Co., 36 Warren St., New York, N. Y.

BOILERS RETUBED
*BIGELOW CO., 76 River St., New Haven, Conn...*p. 58*
CONNERY & CO. (Inc.), 2nd & Luzerne Sts., Philadelphia, Pa...*p. 651*
KROESCHELL BROS. CO., 460 West Erie St., Chicago, Ill...*p. 75*
Wendland, C. F. Engineering & Construction Co., 63 Wooster St., New York, N. Y.

BOLT AND NUT MACHINERY
Acme Machinery Co., 4533 St. Clair Ave., N. E., Cleveland, Ohio.
Ajax Mfg. Co., 3830 Lakeside Ave., Cleveland, Ohio.
Brown, H. B. Co., East Hampton, Conn.
Howard Iron Works, 285 Chicago St., Buffalo, N. Y.
Kent Machine Co., Kent, Ohio.
*LANDIS MACHINE CO. (Inc.), Waynesboro, Pa...*pp. 496, 497*
National Machinery Co., Tiffin, Ohio.
NILES-BEMONT-POND CO., 111 Broadway, New York, N. Y...*p. 470*

BOLT CUTTERS, ETC.
(See Cutters, etc., Bolt)

BOLTS
Arghis, E. J., 74 Wall St., New York, N. Y.
AUTOMATIC PRODUCTS CORP'N., 199-203 Eighth St., Long Island City, N. Y...*p. 518*
Bayonne Bolt & Nut Co., Bayonne, N. J.
Bell Co., 1555 Fillmore Ave., Buffalo, N. Y.
Bourne-Fuller Co., 1422 Euclid Ave., Cleveland, Ohio.
Clark Bros. Bolt Co., Milldale, Conn.
COLUMBUS BOLT WORKS CO., Columbus, Ohio...*p. 522*
Eastern Bolt & Nut Co., Providence, R. I.
Falls Rivet Co., Kent, Ohio.
Grip Nut Co., 5917 S. Western Ave., Chicago, Ill.
Halls, Samuel Sons, 229 W. 10th St., New York, N. Y.
Lamson & Sessions Co., Cleveland, Ohio.
Michigan Bolt & Nut Works, Detroit, Mich.
NATIONAL ACME CO., Cleveland, Ohio...*pp. 464, 465*
National Lock Co., Rockford, Ill.
National Screw & Tack Co., 7413 Stanton Ave., Cleveland, Ohio.
Pittsburgh Screw & Bolt Co., Preble Ave., Pittsburgh, Pa.
Positive Lock-Bolt Co., 6528 Carnegie Ave., Cleveland, Ohio.
Selflock Nut & Bolt Co. (Inc.), East Syracuse, N. Y.
Standard Bolt Co., Columbus, Ohio.
Standard Turnbuckle Co., Woolworth Bldg., New York, N. Y.

—Brass and Bronze
AUTOMATIC PRODUCTS CORP'N., 199-203 Eighth St., Long Island City, N. Y...*p. 518*
Everitt Co., 261 Franklin St., Boston, Mass.
*REED & PRINCE MFG. CO., Worcester, Mass...*p. 524*
Standard Screw Products Co., Bellevue & Warren Aves., Detroit, Mich.

—Carriage
Clark Bros. Bolt Co., Milldale Conn.
COLUMBUS BOLT WORKS, Columbus, Ohio...*p. 522*
Ohio Nut & Bolt Co., Berea, Ohio.
*REED & PRINCE MFG. CO., Worcester, Mass...*p. 524*
RUSSELL, BURDSALL & WARD BOLT & NUT CO. (''Empire'' ''Eagle''), Port Chester, N. Y...*p. 525*

—Connecting Rods
Cleveland Wrought Products Co., 3590 West 58th St., Cleveland, Ohio.

—Expansion
Brohard Co, 3rd St. & Lehigh Ave., Philadelphia, Pa.
Church, Isaac Expansion Bolt Co, (''O.K.'') (''Perfect''), 1 Fourth St., East Norwalk, Conn.
DIAMOND EXPANSION BOLT CO. (''Diamond-N-Y'') 90 West St., cor Cedar, New York, N. Y...*p. 526*
Estate H. F. Evans, 31-35 Hewes St., Brooklyn, N. Y.
National Lead Co., 111 Broadway, New York, N. Y.
NEWHALL CHAIN FORGE & IRON CO., 90 West St., New York, N. Y...*p. 410*
NEW JERSEY FOUNDRY & MACHINE CO., 90 West St., New York, N. Y...*p. 396*
Steward & Romaine Mfg. Co., 124 N. 6th St., Philadelphia, Pa.
U. S. Expansion Bolt Co., 139 Franklin St., New York, N. Y.

—Eye
Brohard Co., 3rd St. & Lehigh Ave., Philadelphia, Pa.
LAKESIDE FORGE CO., Erie, Pa...*p. 429*
NEWHALL CHAIN FORGE & IRON CO., 90 West St., New York, N. Y...*p. 410*
WILLIAMS, J. H. & CO., 70 Richards St., Brooklyn, N. Y...*p. 517*

—Hanger
*REED & PRINCE MFG. CO., Worcester, Mass...*p. 524*

—Lag
COLUMBUS BOLT WORKS, Columbus, Ohio...*p. 522*

—Machine
AUTOMATIC PRODUCTS CORP'N, 199-203 Eighth St., Long Island City, N. Y...*p. 518*
Church, Isaac Expansion Bolt Co., 1 Fourth St., East Norwalk, Conn.
Clark Bros. Bolt Co., Milldale, Conn.
COLUMBUS BOLT WORKS CO., Columbus, Ohio...*p. 522*
Hall's, Samuel Sons, 229 W. 10th St., New York, N. Y.
Merrill Bros., Maspeth, N. Y.
Ohio Nut & Bolt Co., Berea, Ohio.
Oliver Iron & Steel Co., So. 10th & Muriel Sts., Pittsburgh, Pa.
Rhode Island Tool Co., 148 West River St., Providence, R. I.
RUSSELL, BURDSALL & WARD BOLT & NUT CO., (''Empire''), Port Chester, N. Y...*p. 525*

—Machine Table
STANDARD SHOP EQUIPMENT CO., 23rd St., & Hunting Park Avenue., Philadelphia, Pa...*p. 515*

Digitized by Google

—Patch
Church, Isaac Expansion Bolt Co., 1 Fourth Ave., East Norwalk, Conn.

—Plow
RUSSELL, BURDSALL & WARD BOLT & NUT CO. (''Empire''), Port Chester, N. Y...*p. 525*

—Shackle
Standard Turnbuckle Co., Woolworth Bldg. New York, N. Y.

—Special
*REED & PRINCE MFG. CO., Worcester, Mass...*p. 524*

—Spindle
E. C. Mfg. Co., 546-548 W. Harrison St., Chicago, Ill.

—Spring
Bowen Products Corp'n, Auburn, N. Y.
Brown Co., Syracuse, N. Y.
Ferry Cap & Set Screw Co., 2151 Scranton Road, Cleveland, Ohio.
Fostoria Screw Co., Fostoria, Ohio.
Steel Products Co., Cleveland, Ohio.

—Stove
AMERICAN SCREW CO., Providence, R. I. ..*p. 520*
Corbin Screw Corp'n., New Britain, Conn.
Ohio Nut & Bolt Co., Berea, Ohio.
Reading Screw Co., Main & Gary Sts., Norristown, Pa.
*REED & PRINCE MFG. CO., Worcester, Mass...*p. 524*
RUSSELL, BURDSALL & WARD BOLT & NUT CO. (''Empire''), Port Chester, N. Y...*p. 525*

—Stud
AUTOMATIC PRODUCTS CORP'N., 199-203 Eighth St., Long Island City, N. Y. ..*p. 518*
BLAKE & JOHNSON CO., Waterbury, Conn. ..*p. 491*
The Cleveland Wrought Products Co., 8590 West 58th St., Cleveland, Ohio.
Niagara Screw Co., 20 Lock St., Buffalo, N. Y.
*REED & PRINCE MFG. CO., Worcester, Mass...*p. 524*
RUSSELL, BURDSALL & WARD BOLT & NUT CO. (''Empire''), Port Chester, N. Y...*p. 525*
Steward & Romaine Mfg. Co., 124 No. 6th St., Philadelphia, Pa.

—Tap
RUSSELL, BURDSALL & WARD BOLT & NUT CO. (''Empire''), Port Chester, N. Y...*p. 525*

—Tire
AMERICAN SCREW CO., Providence, R. I... *p. 520*
Corbin Screw Corp'n., New Britain, Conn.
RUSSEL BURDSALL & WARD BOLT & NUT CO. (''Empire'' ''Eagle''), Port Chester, N. Y...*p 525*

—Toggle
DIAMOND EXPANSION BOLT CO., (''Diamond N-Y''), 90 West St., cor. Cedar, New York, N. Y...*p. 526*
NEWHALL CHAIN FORGE & IRON CO., 92 West St., New York, N. Y...*p. 410*
Steward Romaine Mfg. Co., 124 N. 6th St., Philadelphia, Pa.
U. S. Expansion Bolt Co., 139 Franklin St., New York, N. Y.

—Track
National Bolt & Nut Co., 62nd St. & A.V. R. R., Pittsburgh, Pa.

BOOK-BINDERS' MACHINERY
Southworth Machine Co., Warren Ave., Portland, Maine.

BOOSTERS, GAS
AMERICAN GAS FURNACE CO., Elizabeth, N. J...*p. 527*
Connersville Blower Co., Connersville, Ind.
HOPE ENGINEERING & SUPPLY CO. (''Reeves'') Mt. Vernon, Ohio...*p. 49*
*INGERSOLL-RAND CO., 11 Broadway, New York. N. Y...*pp. 546, 547*
*LAMMERT & MANN CO., Wood & Walnut Sts., Chicago, Ill...*p. 561*

BORING AND DRILLING MACHINES
Defiance Machine Works, Defiance, Ohio.
Gisholt Machine Co., Madison, Wis.
Milwaukee Electric Crane & Mfg. Co., 60th & Greenfield Ave., Milwaukee, Wis.
Munson Mill Machinery Co. (Inc.), 405 Broadway, Utica, N. Y.
NILES-BEMENT-POND CO., 111 Broadway, New York, N. Y...*p. 470*
*PAWLING & HARNISCHEGER CO. (''P & A''), Milwaukee, Wis...*p. 398*
Pedrick Tool & Machine Co., 3642 N. Lawrence St., Philadelphia, Pa.
Universal Boring Machine Co., Hudson, Mass.

BORING AND TAPPING MACHINES (For Valves)
Beaman & Smith Co., Providence, R. I.

BORING AND TURNING MILLS (Vertical)
Bennett, Howard D., 2114 Allendale St., Baltimore, Md.
Betts Machine Co., Rochester, N. Y.
Bickford, H. & Co., Lakeport, N. H.
Bullard Machine Tool Co. (''Maxi-Mill''), Bridgeport, Conn.
Cincinnati Planner Co., Oakley, Cincinnati, Ohio.
COLBURN MACHINE TOOL CO. (THE), Cleveland, Ohio...*pp. 466, 467*
NILES BEMENT-POND CO., 111 Broadway, New York, N. Y...*p. 470*

BORING, DRILLING AND MILLING MACHINES (Horizontal Combined)
Cleveland Machine Tool Works, 185-11 Euclid Ave., Cleveland, Ohio.
Espen-Lucas Machine Works. Front St. & Girard Ave., Philadelphia, Pa.
Giddings & Lewis Machine Tool Co., Fond du Lac, Wis.
Lucas Machine Tool Company., 523 E. 99th St., Cleveland, Ohio.
Multiplex Tool Co. (Inc.), 76 S. 8th St., Brooklyn, N. Y.
NILES-BEMENT-POND CO., 111 Broadway, New York, N. Y...*p. 470*
Universal Boring Machine Co., Hudson, Mass.

BORING MACHINES
—Cylinder
Barrett Machine Tool Co., Meadville, Pa.
Beaman & Smith Co., Providence, R. I.
Defiance Machine Works, Defiance, Ohio.
Moline Tool Co., Moline, Ill.
NILES-BEMENT-POND CO., 111 Broadway, New York, N. Y...*p. 470*
Rooksby, E. J. & Co., 1042 Rigde Ave., Philadelphia, Pa.

—Cylinder (Locomotive)
Barrett Machine Tool Co., Meadville, Pa.

—Horizontal
Barrett Machine Tool Co., Meadville, Pa.
Giddings & Lewis Machine Tool Co., Fond du Lac, Wis

—Multiple Spindle
Barrett Machine Tool Co., Meadville, Pa.
Greenlee Bros. & Co., Rockford, Ill.
Moline Tool Co., Moline, Ill.
*NILES-BEMENT-POND CO., 111 Broadway, New York, N. Y...*p. 470*

Bo

Digitized by Google

—Vertical
Baker Brothers, Post & Westlake St., Toledo, Ohio.
Bullard Machine Tool Co., Bridgeport, Conn.
NILES-BEMENT-POND CO., 111 Broadway, New York, N. Y...*p. 470*

BORING TOOLS
(See Tools, Boring)

BORTZ
Diamond Drill Carbon Co., 61 Park Row, New York, N. Y.

BOTTLE BLOWING MACHINERY
Lynch Glass Machinery Co., Anderson, Ind.

BOTTLE CARTONING MACHINES
National Packing Machinery Co. 174 Green St., Jamaica Plain, Boston, Mass.

BOTTLE GRADUATING MACHINERY
Burr Co., Champaign, Ill.

BOTTLE MOLD CUTTING MACHINES
KELLER MECHANICAL ENGRAVING CO., 68 Washington St., Brooklyn, N. Y...*p. 495*

BOTTLE WASHING MACHINERY
Davis-Watkins Dairymen s Mfg. Co., 130 No. Wells St., Chicago, Ill.
Loew Mfg. Co., 9100 Madison Ave., Cleveland, Ohio.
Rice & Adams Corp'n., 180 Chandler St., Buffalo, N. Y.

BOTTLING MACHINERY
Davis-Watkins Dairymen's Mfg. Co., 130 No. Wells St., Chicago, Ill.

BOX MAKING MACHINERY
—Paper
DOVE-SMITH & SON, Niagara Falls, N. Y. ..*p. 492*
Griswold, Geo. M. Machine Co., New Haven, Conn.
Jegenberg Machine Co. (Inc.), 131 W. 24th St., New York, N. Y.
Knowlton, M. D. Co., 29 Elizabeth St., Rochester, N. Y.
National Packaging Machinery Co., 174 Green St., Jamaica Plain, Boston, Mass.
Robinson, John T. Co., Hyde Park Sta., Boston, Mass.
Staude, E. G. Mfg. Co., 2675 University Ave., St. Paul, Minn.
Stokes & Smith Co., Roosevelt Blvd. & Summerdale Ave., Philadelphia, Pa.
—Wood
Cobden Machine Works, Cobden, Ill.
Chase Turbine Mfg. Co., Orange, Mass.
Luster-Jordan Co. (Inc.), W. Washington St., Norristown, Pa.
Mereen-Johnson Machine Co., Minneapolis, Minn.
—Annealing and Carburizing
Garwood Bronze & Iron Works, Garwood, N. J.
MALLEABLE IRON FITTINGS CO., Branford, Conn...*p. 236*
NEW YORK CENTRAL IRON WORKS CO. (Inc.), North Middleburg Road, Hagerstown, Md...*p. 659*
Union Steel Casting Co., 62nd & Butler Sts., Pittsburgh, Pa.
—Case Hardening
Bell & Gossett Co., 117 N. Dearborn St., Chicago, Ill.
Driver-Harris Co., Harrison, N. J.
Sivyer Steel Casting Co., 37th Ave. & Mitchell St., Milwaukee, Wis.
Swedish Crucible Steel Co. ("Pyro"), Butler & Grand Trunk Ry., Detroit, Mich.
—Fibre
AMERICAN VULCANIZED FIBRE CO., Wilmington, Del...*p. 417*
DIAMOND STATE FIBRE CO., Bridgeport, Pa...*p. 420*
—Journal
(See Journal Boxes)
—Metal
Cleveland Wire Spring Co., East 38th & Hamelton Ave., Cleveland, Ohio.
GEUDER, PAESCHKE & FREY CO., Western Valley, Milwaukee, Wis...*p. 434*
Globe Machine & Stamping Co., 1254 W. 76th St., Cleveland, Ohio.
Lyon Metallic Mfg. Co., Aurora, Ill.
—Piling (Steel)
Cleveland Wire & Spring Co., East 38th & Hamelton Ave., Cleveland, Ohio.
—Steam
SMITH, SAMUEL & SON CO., Paterson, N. J...*p. 88*
—Tool
Cleveland Wire Spring Co., East 38th & Hamelton Ave., Cleveland, Ohio.
Keighley, A. Metal Ceiling & Mfg. Co., 124 3rd Ave., Pittsburgh, Pa.
Lupton's, David Sons Co., Allegheny Ave. & Tulip St., Philadelphia, Pa.
—Tote
NEW BRITAIN MACHINE CO., New Britain, Conn...*p. 463*

BRAIDING MACHINES
NEW ENGLAND BUTT CO., Providence, R. I...*p. 639*
TEXTILE MACHINE WORKS, Reading, Pa. ..*p. 644*
—Hose
TEXTILE MACHINE WORKS, Reading, Pa. ..*p. 644*

BRAKE BLOCKS
*JOHNS-MANVILLE (Inc.), New York. N. Y...*p. 244*
Thermoid Rubber Co., Trenton, N. J.

BRAKE SHOES (Wheel Truing)
American Abrasive Metals Co., 50 Church St., New York, N. Y.

BRAKES
—Air
*ALLIS-CHALMERS MFG. CO., Milwaukee. Wis...*pp. 28, 29*
Christensen Engineering Co., 1813 Fond du Lac Ave., Milwaukee, Wis.
*GENERAL ELECTRICAL CO., Schenectady. N. Y...*pp. 18, 19, 20, 21*
WESTINGHOUSE TRACTION BRAKE CO., Wilmerding, Pa...*pp. 550, 551*
—Electric
*GENERAL ELECTRIC CO., Schenectady, N. Y...*pp. 18, 19, 20, 21*

BRASS (Roll, Sheet, etc.)
AMERICAN BRASS CO., Waterbury, Conn... *p. 414*
Chase Rolling Mill Co., Waterbury, Conn.
Rutter, Arthur T. & Co., 256 Broadway, New York, N. Y.
Winchester Repeating Arms Co., New Haven, Conn.

BRASS GOODS
American Lubricator Co., Detroit, Mich.
BUCKEYE IRON & BRASS WORKS, Dayton, Ohio..*p. 168*
Cleveland Brass Mfg. Co., 4606 Hamilton Ave., Cleveland, Ohio
Commonwealth Brass Corp'n, Commonwealth Ave. & Grand Trunk Ry., Detroit, Mich.
*CRANE CO., 836 So. Michigan Ave., Chicago, Ill...*pp. 170, 171, 172, 173*
Grand Rapids Brass Co., 90 Scribner Ave., N. W., Grand Rapids, Mich.
*GREENE, TWEED & CO., 109 Duane St., New York, N. Y...*p. 250*

Digitized by Google

KELLY & JONES CO., Greensburg, Pa...*pp. 182, 183*
Michigan Lubricating Co, 3643 Beaubien St., Detroit. Mich.
Mueller, H. Mfg. Co., Decatur, Ill.
Nathan Mfg. Co., 21 East Fortieth St., New York, N. Y.
*RICHARDSON-PHENIX CO., 126 Reservoir Ave., Milwaukee, Wis...*pp 248, 249*
Risdon Mfg. Co., Naugatuck, Conn.
Rutter, Arthur T. & CO., 256 Broadway, New York, N. Y.
Scovill Mfg. Co., 99 Mill St., Waterbury, Conn.
Smith, A. P. Mfg. Co., East Orange, N. J.
Sterling Specialty Co., Newcomerstown, Ohio

BRASS MILL MACHINERY
Farnham Mfg. Co., 31-39 Indiana St., Buffalo, N. Y.
POOLE ENGINEERING & MACHINE CO., Woodberry, Baltimore, Md...*pp. 316, 317*
TORRINGTON MFG. CO., Torrington, Conn. ..*p. 641*

BRASS WORK (Ornamental)
(See Ornamental Work)

BRASS WORKING MACHINERY
AMERICAN TOOL & MACHINE CO., Boston 9, Mass...*p. 614*
*WARNER & SWASEY CO., Cleveland, O... *pp. 456, 457*

BREECHINGS (Smoke)
Abendroth, G. Irving Co., 10 E 43d St., New York, N. Y.
Acme Boiler & Tank Co., 48th & Morgan Sts , Chicago, Ill.
BASS FOUNDRY & MACHINE CO., Fort Wayne, Ind...*p. 57*
BROWNELL CO., Dayton, Ohio...*p. 59*
*CASEY-HEDGES CO., Chattanooga, Tenn. ..*pp. 60, 61*
CONNERY & CO. (Inc.), 2nd & Luzerne Sts., Philadelphia, Pa...*p. 651*
*HEINE BOILER CO (''Heine''), St. Louis, Mo...*pp. 70, 71*
HONHORST, JOS. CO., 1016-20 W. 6th St., Cincinnati, Ohio..*p. 654*
*KEELER, E. CO., Williamsport, Pa...*p. 69*
KEWANEE BOILER CO., Kewanee, Ill...*pp. 622, 623, 624*
LANCASTER IRON WORKS (Inc), Lancaster, Pa...*pp. 656, 657*
LASKER IRON WORKS, 3201 So. Lincoln St., Chicago, Ill...*p. 655*
LEBANON BOILER WORKS (J. K. Petty & Co., Inc.), 6 So. 15th St., Philadelphia, Pa...*pp. 78, 79*
McNamara Brothers Co., Westport, Baltimore, Md.
MURRAY IRON WORKS CO., Burlington Iowa...*pp. 80, 81*
NEW YORK CENTRAL IRON WORKS CO. (Inc.), North Middleburg Road, Hagerstown, Md...*p. 659*
*O'BRIEN, JOHN BOILER WORKS CO., St. Louis, Mo...*p. 83*
*TITUSVILLE IRON WORKS CO., Titusville, Pa...*p. 89*
Turl Iron & Car Co (Inc.), 50 Broad St., New York, N. Y.
*U. S. CAST IRON PIPE & FOUNDRY CO., Burlington, N. J...*pp. 232, 233*
*WALSH & WEIDNER BOILER CO., Chattanooga, Tenn...*p. 91*
Wildex Co., Richmond, Ind.

BRICK

—Arch (Locomotive)
American Arch Co., Inc , 14 East 42nd St., New York, N. Y.

—Blast Furnace
Ashland Fire Brick Co., Ashland, Ky.
BERNITZ FURNACE APPLIANCE CO. (''Long Life''), 15 State Street, Boston, Mass...*p. 133*
*CRESCENT REFRACTORIES CO., Curwensville, Clearfield County, Pa...*p. 136*
Union Mining Co., 1113 Fidelity Bldg., Baltimore, Md.

—Chrome
Harbison-Walker Refractories Co., Farmers Bank Bldg., Pittsburgh, Pa.

—Concrete
Shope Brick Co., 361½ East Morrison St., Portland, Oregon

—Enameled
American Enameled Brick & Tile Co., 52 Vanderbilt Ave., New York

—Fire
American Enameled Brick & Tile Co., 52 Vanderbilt Ave., New York
Ashland Fire Brick Co., Ashland, Ky.
BERNITZ FURNACE APPLIANCE CO. (''Long Life''), 15 State Street, Boston, Mass ..*p. 133*
Betson Plastic Fire Brick Co. (Inc.), (''Plastic''), Box 368-A, Rome, N. Y.
*CRESCENT REFRACTORIES CO., Curwensville, Clearfield County, Pa...*p. 136*
Detrick, M. H. Co., 549 W. Washington St., Chicago, Ill.
Dover Fire Brick Co., 509 Cuyahoga Bldg , Cleveland, Ohio
DRAKE NON-CLINKERING FURNACE BLOCK CO., 5 Beekman St., New York, N. Y...*p. 134*
Evens & Howard Fire Brick Co., 920 Market St., St. Louis, Mo.
Gardner, James, Jr., Co. (''Hitemp''). Ebensburg, Pa.
Green, A P. Fire Brick Co., Mexico, Mo.
Harbison-Walker Refractories Co., Farmers' Bank Bldg., Pittsburgh, Pa.
Hoffman, Chas. V. Co. (Inc.), 95 Liberty St., New York, N. Y.
Jointless Fire Brick Co. (''Plibrico''), 1130 Clay St., Chicago, Ill.
Kier Fire Brick Co , 2243 Oliver Bldg., Pittsburgh, Pa.
*KING REFRACTORIES CO. (Inc.), (''Flame Brand''), 1709 Niagara St., Buffalo, N. Y...*p. 137*
McLeod & Henry Co., Troy, N. Y.
Maurer, Henry & Son, 420 E. 23rd St., New York. N Y.
Peekskill Fire Brick Works (Inc.), 26-44 S. Water St., Peekskill, N. Y.
Pyro Clay Products Co., Oak Hill, Ohio
Seaboard Refractories, P. O. Box 327, Perth Amboy, N. J.
Southern Refractories Co., Fort Payne, Ala.
Swank's, Hiram Sons (Inc.), Drawer ''L'', Johnstown, Pa.
Taylor, Charles Sons Co., 706 Burns St., Cincinnati, Ohio
Union Mining Co., 1113 Fidelity Bldg., Baltimore, Md.
Wagner Fire Brick Co (Inc.), Union National Bank Bldg., Scranton, Pa.
Walsh Fire Clay Products Co., 4070 N. Main St., St. Louis, Mo.

—Insulating
*CELITE PRODUCTS CO., 11 Broadway, New York...*p. 135*
*QUIGLEY FURNACE SPECIALTIES CO. (Inc.), (''Insulbrix''), 26 Cortlandt St., New York, N Y...*pp. 129, 138, 139*

—Magnesia
Harbison-Walker Refractories Co., Farmers' Bank Bldg., Pittsburgh, Pa.
*JOHNS-MANVILLE (Inc.), New York, N. Y...*p. 244*

—Puddling Furnace
*CRESCENT REFRACTORIES CO., Curwensville, Clearfield County, Pa...*p. 136*

Br

Digitized by Google

Union Mining Co., 1113 Fidelity Bldg., Baltimore, Md.

—Rubbing
NORTON CO., Worcester, Mass ..*pp. 489, 510*
STERLING GRINDING WHEEL CO. (''Sterbon-SiC''), Tiffin, Ohio...*p. 511*

—Silica
Harbison-Walker Refractories Co., Farmers' Bank Bldg., Pittsburgh, Pa.
Kier Fire Brick Co., 2243 Oliver Bldg., Pittsburgh, Pa.
Mt. Union Refractories Co., Mt. Union, Pa
Swank's Hiram Sons (Inc.), Drawer ''L'', Johnstown, Pa.
Union Mining Co. (''Mount Savage''), 1113 Fidelity Bldg., Baltimore, Md.

BRICK MAKING MACHINERY
Anderson Foundry & Machine Co., Anderson, Ind.
BONNOT CO., Canton, Ohio...*p. 598*
CHAMBERS BROS CO., Philadelphia, Pa. ..*p. 599*
Fernholtz Brick Machinery Co., 1446 S. Vandeventer Ave., St. Louis, Mo.
Freese, E. M. & Co., 180 South St., Galion, Ohio.
International Clay Machinery Co., 1057 Bohlender Ave., Dayton, Ohio
LANCASTER IRON WORKS (Inc), Lancaster, Pa...*pp. 656, 657*
Schultz, A. L. & Son, 1675 Elston Ave., Chicago, Ill.
Shope Brick Co. (''Shope''), 361½ East Morrison St., Portland, Oregon
Stevenson Co., Wellsville, Ohio
UNION ENGINEERING CO., Cleveland, O... *p 645*
Wellington Machine Co., Wellington, Ohio

BRIDGE TRAMWAYS
(See Tramways, Bridge)

BRIDGE WALLS (Furnace)
Wager Furnace Bridge Wall Co. (Inc.), 149 Broadway, New York, N. Y.

BRICK YARD SUPPLIES
Fernholtz Brick Machinery Co., 1446 S. Vandeventer Ave., St. Louis, Mo.

BRIDGES
—Coal and Ore Handling
*BROWN HOISTING MACHINERY CO., Cleveland, Ohio...*p. 390*
Lakeside Bridge & Steel Co., 404 Villard Ave., North Milwaukee, Wis.
Heyl & Patterson Inc., 51 Water St., Pittsburgh, Pa.
Robbins Engineering Co., Old Colony Bldg., Chicago, Ill.

—Movable
American Bridge Co., 30 Church St., New York, N. Y.

—Salt Handling
Lakeside Bridge & Steel Co., 404 Villard Ave., North Milwaukee, Wis.

—Steel
Continental Bridge Co., Peotone, Ill.
McClintic-Marshall Co., 1217 Oliver Bldg., Pittsburgh, Pa.
Phoenix Iron Co., 22 So. 15th St., Philadelphia, Pa.

—Suspension
*ROEBLING'S, JOHN A. SONS CO., Trenton, N. J...*p. 409*

BRIQUETTING MACHINERY
CHAMBERS BROS. CO., Philadelphia, Pa. ..*p. 599*
General Briquetting Co., 25 Broad St., New York

—Coal
General Briquetting Co., 25 Broad St., New York
Malcolmson Briquet Engineering Co., Old Colony Bldg., Chicago, Ill.
Mashek Engineering Co., 90 West St , New York

BROACHING MACHINES
Connecticut Broach & Machine Co., New London, Conn.
Lapointe, J. N. Co., New London, Conn.
Lapointe Machine Tool Co., Hudson, Mass.
Racine Tool & Machine Co., Racine, Wis
VELCO MFG. CO. (Inc.), Greenfield, Mass. ..*p. 461*
WATSON-STILLMAN CO., 35 Church St., New York, N. Y...*p 596*

—Hydraulic
GALLAND-HENNING MFG. CO., Milwaukee, Wis...*p. 592*

BRONZE WORK (Ornamental)
(See Ornamental Work)

BRONZES
—Bearing
ALLAN, A. & SON, Harrison, N. J...*p. 413*
AMERICAN BRASS CO., Waterbury, Conn. ..*p. 414*
American Bronze Corpn. (''Non-Gran''), Berwyn, Pa.
BUNTING BRASS & BRONZE CO., 720 Spencer St., Toledo, Ohio...*p. 337*
*JOHNSON BRONZE CO., New Castle, Pa. ..*p. 338*
LUMEN BEARING CO (''Lumen''), Buffalo, N. Y...*p. 416*

—Manganese
Ajax Metal Co., 46 Richmond St., Philadelphia, Pa.
ALLAN, A. & SON, Harrison, N. J...*p. 413*
AMERICAN BRASS CO , Waterbury, Conn. ..*p. 414*
*HENDRICK MFG. CO., Carbondale, Pa... *p. 658*
LUMEN BEARING CO., Buffalo, N. Y...*p. 416*

—Phosphor
ALLAN, A. & SON, Harrison, N. Y...*p. 413*
Alloy Foundry and Machine Corpn., New Rochelle, N. Y.
AMERICAN BRASS CO., Waterbury, Conn. ..*p. 414*
LUMEN BEARING CO., Buffalo, N. Y...*p 416*
Seymour Mfg. Co., Seymour, Conn.

—Plastic
ALLAN, A. & SON, Harrison, N. J...*p. 413*

—Tobin
AMERICAN BRASS CO., Waterbury, Conn. ..*p. 414*

BUCKETS
—Bottom Discharge
STUEBNER, G. L. IRON WORKS, Hancock St. & Vernon Ave., Long Island City, N. Y...*p. 408*

—Clamshell
Blaw-Knox Co., P. O Box 915, Pittsburgh, Pa.
Brosius, Edgar E., 1212 Benedum Trees Bldg., Pittsburgh, Pa.
*BROWN HOISTING MACHINERY CO., Cleveland, Ohio...*p. 390*
Browning Co., 16226 Waterloo Road, Cleveland, O
Buffalo Hoist & Derrick Co., 129 Erie St., Buffalo, N. Y.
Haiss, George Mfg. Co. (Inc.), 141st St. & Rider Ave., New York, N. Y
Hayward Co., 50 Church St., New York
Lakewood Engineering Co., Cleveland, Ohio
Owen Bucket Co., 406 Rockefeller Bldg. Cleveland, Ohio
Smith, Theo. & Sons Co., Jersey City, N. J.
Williams, G. H. Co., P. O. Box 711, Erie, Pa.

Digitized by Google

—Drag Line
American Mfg. & Engr. Co., Goshen, Ind.
Hayward Co., 50 Church St., New York

—Electrically Operated
Hayward Co., 50 Church St., New York, N. Y.

—Elevator
BARLETT, C. O. & SNOW CO., Cleveland, Ohio...*p. 367*
*CALDWELL, H. W. & SON CO., 17th St. & Western Ave., Chicago, Ill...*p. 370*
*GIFFORD-WOOD CO , Hudson, N. Y...*pp. 498, 499*
*HENDRICK MFG. CO., Carbondale, Pa...*p. 653*
HONHORST, JOS. CO., 1016-20 W. 6th St., Cincinnati, Ohio...*p. 654*
Howe Chain Co., 104 East Clay Ave , Muskegon, Mich.
INDUSTRIAL WORKS, Bay City, Mich...*pp. 392, 393*
JEFFREY MFG. CO., 904 N. 4th St., Columbus, Ohio...*pp. 376, 377*
*JONES, W. A FOUNDRY & MACHINE CO., 4415 West Roosevelt Road, Chicago, Ill...*pp. 312, 313, 314, 315*
Moore, George W. Co., 2144-52 Fulton St., Chicago, Ill.
ROBINS CONVEYING BELT CO., Park Row Bldg., New York, N. Y ..*p. 373*
Specialty Engineering Co., Alleghany & Trenton Aves., Philadelphia, Pa.
Webster Mfg. Co., 4500-4560 Cortland St., Chicago, Ill.

—Excavating
Biehl Iron Works (Inc.), Reading, Pa.
Industrial Supply & Equipment Co , 407 Sansom St., Philadelphia, Pa.
Owen Bucket Co., 406 Rockefeller Bldg., Cleveland, Ohio
Rochester Excavating Machinery Co., Caledonia, N. Y.
STUEBNER, G. L. IRON WORKS, Hancock St. & Vernon Ave., Long Island City ..*p. 408*
Williams, G. H. Co., P. O. Box 711, Erie, Pa.

—Grab
Advance Engineering Co., Cleveland, Ohio
Andresen-Evans Co., 646 Railway Exchange Bldg., Chicago, Ill
*BROWN HOISTING MACHINERY CO., Cleveland, Ohio...*p. 390*
Buffalo Contractors Plant Corpn., 129 Erie St., Buffalo, N. Y.
Hayward Co., 50 Church St., New York
HUNT, C. W CO. (Inc.), West New Brighton, Staten Island, N. Y...*pp. 374, 375*
Industrial Supply & Equipment Co., 407 Sansom St., Philadelphia, Pa.
INDUSTRIAL WORKS, Bay City, Mich...*pp. 392, 393*
MORRIS, HERBERT (Inc.), 1-15 Lawrence Place, Buffalo, N. Y ..*p. 402*
Owen Bucket Co., 406 Rockefeller Bldg., Cleveland. Ohio
*PAWLING & HARNISCHFEGER CO. (''P. & H.''), Milwaukee, Wis...*p. 398*
Rochester Excavating Machinery Co., Caledonia, N. Y
Wellman-Seaver-Morgan Co., Cleveland, Ohio

—Hoisting
STUEBNER, G. L. IRON WORKS, Hancock St. & Vernon Ave., Long Island City, N. Y...*p. 408*

—Orange Peel
Andresen-Evans Co., 646 Railway Exchange Bldg., Chicago, Ill
Hayward Co., 50 Church St., New York
Smith, Theo. & Sons Co., Jersey City, N. J.

—Self Dumping
*BROWN HOISTING MACHINERY CO., Cleveland, Ohio...*p. 390*
HUNT, C. W CO. (Inc.), West New Brighton, Staten Island, N. Y...*pp. 374, 375*
JEFFREY MFG. CO., 904 N. 4th St., Columbus, Ohio...*pp. 376, 377*
Sackett, H. B Screen & Chute Co., 1679-1691 Elston Ave., Chicago, Ill.
STUEBNER, G. L. IRON WORKS, Hancock St. & Vernon Ave., Long Island City, N. Y...*p. 408*

BUCKLE MACKING MACHINES
Nilson, A. H. Machine Co., 1525 Railroad Ave., Bridgeport, Conn.

BUFFING WHEELS
Divine Bros. Co., Utica, N. Y.

BULL RING METAL
ALLAN, A. & SON, Harrison, N. J...*p. 413*

BULLDOZERS
Ajax Mfg. Co., 3880 Lakeside Ave., Cleveland, O.
ELMES, CHAS. F. ENGINEERING WORKS, 215 N. Morgan St., Chicago, Ill...*p. 591*
NILES-BEMENT-POND CO., 111 Broadway, New York, N. Y...*p. 470*
Rock River Machine Co , Janesville, Wis.
WATSON-STILLMAN CO., 35 Church St., New York, N. Y...*p. 596*
Williams, White & Co., Moline, Ill.
WOOD, R. D. & CO., Philadelphia,..*p. 597*

BUNDLERS, SCRAP METAL
Chicago Baling Press Mfg. Co., 305 S. La-Salle St., Chicago, Ill.
GALLAND-HENNING MFG. CO., Milwaukee, Wis,..*p. 592*

BUNKERS (Coal and Ash)
*BEAUMONT, R. H. CO., 340 Arch St., Philadelphia, Pa...*pp. 368, 369*
Guarantee Construction Co., 140 Cedar St., New York, N. Y.
HONHORST, JOS. CO., 1016-20 W. 6th St., Cincinnati, Ohio...*p. 654*
JEFFREY MFG. CO., 904 N. 4th St., Columbus, Ohio...*pp. 376, 377*
McKee, Arthur G. & Co., Rockefeller Bldg.,
McNamara Brothers Co., Westport, Baltimore, Md.
NEW YORK CENTRAL IRON WORKS CO. (Inc.), North Middleburg Road, Hagerstown, Md...*p. 659*

BURNERS

—Blast
ANTHONY CO., 138 West Ave., Long Island City, N. Y...*p. 530*
Davison, N. C. Gas Burner & Welding Co., 3145 Penn Ave., Pittsburgh, Pa.

—Coke Oven Gas
Duquesne Burner Service Co., 965 Union Arcade Bldg., Pittsburgh, Pa.

—Gas
AMERICAN GAS FURNACE CO., Elizabeth, N. J...*p. 527*
ANTHONY COMPANY, 138 West Ave., Long Island City, N. Y...*p. 530*
*BEST. W. N. FURNACE & BURNER CORPN. (''Calorex''), 11 Broadway, New York, N. Y...*pp. 130, 531*
Creaghead Engineering Co., 340-342 Main St., Cincinnati, O.
Davison Gas Burner & Welding Co., N. C., 3145 Penn Ave., Pittsburgh, Pa.
Duquesne Burner Service Co., 965 Union Arcade Bldg., Pittsburgh, Pa.
Hugo Mfg. Co., West Duluth, Minn.
Kemp, C. M. Mfg. Co., 405 E. Oliver St., Baltimore, Md.
*MAXON FURNACE & ENGRG. CO., Muncie, Ind...*pp. 532, 533*
North American Mfg. Co., 5902 Carnegie Ave., Cleveland, Ohio
OVEN EQUIPMENT & MFG. CO., New Haven, Conn...*p. 534*

Bu

Digitized by Google

*ROCKWELL, W. S. CO., 50 Church Street, New York, N. Y...*p. 529*
Selas Co., 1126 Widner Bldg , Philadelphia, Pa.

—Kerosene
ANTHONY CO., 138 West Ave., Long Island City, N. Y...*p. 530*
Champion Kerosene Burner Co. (''Champion''). Lima, Ohio

—Laboratory
Tirrill Gas Machine Lighting Co. (''Tirrill''), 50 Church St., New York, N. Y.

—Oil
Amalgamated Machinery Corpn. (''Nokol''), 215 No. Michigan Ave., Chicago, Ill.
AMERICAN GAS FURNACE CO., Elizabeth, N. J...*p. 527*
ANTHONY COMPANY, 138 West Ave., Long Island City, N. Y...*p. 530*
Berry Engineering Co., Chester, Pa.
*BEST, W. N. FURNACE & BURNER CORPN. (''Calorex''), 11 Broadway, New York, N. Y...*pp. 130, 531*
Burns Hydro Carbon Burner Co., Fort Plain, N. Y.
Cleveland Metal Products Co., 7609 Platt Ave., Cleveland, O.
COEN CO. (Inc.), 112 Market St., San Francisco, Cal
Davison Gas Burner & Welding Co., N. C., 3145 Penn Ave., Pittsburgh, Pa.
Duquesne Burner Service Co., 965 Union Arcade Bldg., Pittsburgh, Pa.
Fess System Co., 220 Natoma St., San Francisco, Cal.
Foundry Equipment Co., 1831 Columbus Rd., Cleveland, Ohio
Gearhart Oil Burner Co., 1314 Eye St., Fresno, Cal.
Gilbert & Barker Mfg. Co., Springfield, Mass.
Hammel Oil Burning Equipment Co., 12 Pearl St., Boston, Mass.
Hauck Mfg. Co., 127 Tenth St., Brooklyn, N. Y.
Hogmann Engineering Co. (Inc.), 557-559 W. Quincy St., Chicago, Ill.
*LOCKETT, A. M. & CO. (''Lockett Flat Flame''), New Orleans, La...*p. 131*
MacLeod Co., 2232 Bogen St., Cincinnati, O.
*MAXON FURNACE & ENGRG. CO , Muncie, Ind...*pp. 532, 533*
Metals Production Equipment Co., 105 W. 40th St., New York.
Monarch Engineering & Mfg. Co., 1206 American Bldg., Baltimore, Md.
Monarch Mfg. Works, Salmon & Westmoreland Sts., Philadelphia, Pa
National Airoil Burner Co., 9th and Thompson Sts., Philadelphia, Pa.
National Supply Co., 412 Orleans St., Chicago, Ill.
Naudain, John E. Sparrows Point, Md.
North American Mfg. Co., 5902 Carnegie Ave., Cleveland, Ohio
Parson Manufacturing Co., P. O Box 212, Elizabeth, N. J.
Peabody Engineering Corpn., 331 Madison Ave., New York, N. Y.
Pyroil Products Co., 4959 Odell Ave., St. Louis, Mo.
Reid, Joseph Gas Engine Co., Oil City, Pa.
*ROCKWELL, W. S. & CO., 50 Church St., New York, N. Y...*p. 529*
Rogers-Higgins Co. (Inc.), 710 Carondelet Bldg., New Orleans, La.
*SCHUTTE & KOERTING CO., 1184 Thompson St., Philadelphia, Pa...*p. 159*
WELLER MFG. CO., 1820-1856 N. Kostner Ave , Chicago, Ill...*p. 381*
Wilgus Mfg. Co. (''Wilgus''), 229 Boyd St., Los Angeles, Cal.

—Oil (Portable)
McKneat Mfg. Co., Easton, Pa.

—Oil (Rotary)
Fess System Co., 220 Natoma St., San Francisco, Cal.
Johnson, S. T. Co., 1337 Mission St., San Francisco, Cal.
Ray, W. S. Mfg. Co., 29 Spear St. San Francisco, Cal.

—Powdered Coal
*FULLER-LEHIGH CO. (''Fuller-Kinyon''), Fullerton, Pa...*p. 128*
Grindle Fuel Equipment Co. (''Grindle''), 1901-1911 S. Rockwell St., Chicago, Ill.
*QUIGLEY FURNACE SPECIALTIES CO. (Inc), 26 Cortlandt St., New York, N. Y. ..*pp. 129, 138, 139*

—Producer Gas
Sauer Power Generating Co., 5115 Rosetta St., Pittsburgh, Pa.

—Sulphur
VALLEY IRON WORKS CO. (''Vesuvious''). Appleton, Wis...*p. 647*

BURRS
*REED & PRINCE MFG. CO., Worcester, Mass...*p. 524*

BUSHINGS

—Bakelite
*CONTINENTAL FIBRE CO. (''Bakelite-Dilecto''), Newark, Del ..*p. 418*

—Brass
LUMEN BEARING CO., Buffalo, N. Y...*p. 416*

—Bronze
ALLAN, A. & SON, Harrison, N. J...*p. 413*
Alloy Foundry and Machine Corpn., New Rochelle, N. Y.
Aluminum Manufactures (Inc.), 6205 Carnegie Ave., Cleveland, Ohio
American Bearing & Die Casting Corpn., 212 W. McCarty St., Indianapolis, Ind.
American Bronze Corpn. (''Non-Gran''). Berwyn, Pa.
Atlas Brass Foundry Co., Columbus, O.
AUTOMATIC PRODUCTS CORPN., 199-203 Eighth St., Long Island City, N. Y. *p. 518*
Brown Co., Syracuse, N. Y.
BUDD GRATE CO., 2013 E. Letterly St , Philadelphia, Pa...*p. 123*
BUNTING BRASS & BRONZE CO., 720 Spencer St., Toledo, Ohio...*p. 337*
DODGE SALES & ENGINEERING CO., Mishawaka, Ind...*pp. 42, 43, 326, 327, 328, 329*
Everitt Co., 261 Franklin St., Boston, Mass.
*HILL CLUTCH CO , Cleveland, O...*p. 331*
*JOHNSON BRONZE CO., New Castle, Pa... *p. 338*
*JONES, W. A. FOUNDRY & MACHINE CO., 4415 West Rossevelt Road, Chicago, Ill...*pp. 312, 313, 314, 315*
Lee, Wm. O. Co., Port Huron, Mich.
LUMEN BEARING CO , Buffalo, N. Y...*p. 416*
Muzzy-Lyon Co., 517-535 W. Larned St., Detroit, Mich.
Niagara Brass Mfg. Co., (Inc.), 163 Adams St., Buffalo, N. Y.
Sterling Specialty Co., Newcomerstown, Ohio

—Bronze and Graphite
BOUND BROOK OIL-LESS BEARING CO., (''Bound Brook''), Bound Brook, N. J. *p 336*
Randall Graphite Products Corp'n, 721 Fulton St., Chicago, Ill.

—Fibre
*CONTINENTAL FIBRE CO., Newark, Del. *p. 418*

Digitized by Google

DIAMOND STATE FIBRE CO., Bridgeport, Pa...*p. 420*

—Impregnated Wood

BOUND BROOK OIL-LESS BEARING CO., (''Nigrum''), Bound Brook, N. J...*p. 336*

—Loose Pulley

DODGE SALES & ENGINEERING CO., Mishawaka, Ind...*pp. 42, 43, 326, 327, 328, 329*

Graphite Metallizing Co. (''Graphalloy''), Yonkers, N. Y.

*HILL CLUTCH CO., Cleveland, Ohio..*p. 331*

*JONES, W. A. FOUNDRY & MACHINE CO., 4415 West Roosevelt Road, Chicago, Ill...*pp. 312, 313, 314, 315*

Karge Baker Corp'n, (''Karge''), Phoenix, N. Y.

METALINE CO., West Ave. near Borden, Long Island City, N. Y...*p. 339*

Nolu Oilless Bearing Co., 6 E. Johnson St., Germantown, Philadelphia, Pa.

Safety First Mfg. Co., (''Bull Dog''), Alexandria, Va.

—Oilless

METALINE CO., West Ave. near Borden, Long Island City, N. Y...*p 339*

—Wood

Detroit Pulley Co., 1331 Bellevue Ave., Detroit, Mich.

Excelsior Pulley Co., 21 Water St., Cuba, N. Y.

BY-PRODUCT COKE OVEN PLANTS

Gas Machinery Co., 1900 Euclid Ave., Cleveland, Ohio

Koppers, H. Co., 800 Union Arcade, Pittsburgh Pa.

Semet-Solvay Co., Station B., Buffalo, N. Y.

BY-PRODUCT RECOVERY PLANTS

Bartlett Hayward Co., Baltimore, Md.

General Reduction, Gas & Byproducts Co., 49 Wall St., New York

Isbell Porter Co., 46 Bridge St., Newark, N. J.

SWENSON EVAPORATOR CO., 945 Monadnock Bldg., Chicago, Ill...*p. 611*

C

CABINETS (Blueprint Filing)

PEASE, C. F. CO., 843 N Franklin St., Chicago, Ill...*p. 664*

Yawman & Erbe Mfg. Co., Rochester, N. Y.

CABLE MAKING MACHINERY

NEW ENGLAND WIRE MACHINERY CO., New Haven, Conn...*p. 640*

CABLE RAILWAYS

(See Railways, Cable)

CABLE TESTING APPARATUS

BIDDLE, JAMES G., 1211-1213 Arch St., Philadelphia Pa...*p. 298*

Leeds & Northrup Co., 4901 Stenton Ave., Philadelphia, Pa.

Thompson-Levering Co., 325 Arch St., Philadelphia, Pa.

CABLES, ELECTRICAL

(See Wire and Cables, Electrical)

CABLES, WIRE

(See Rope, Wire)

CABLEWAYS

—Excavating

*LIDGERWOOD MFG. CO., 96 Liberty St., New York, N. Y...*p. 388*

Sauerman Bros., 314 S. Dearborn St., Chicago, Ill.

—Hoisting and Conveying

Flory, S. Mfg. Co., Bangor, Pa.

Horton, John T. Co., 242 Bradhurst Ave., New York, N. Y.

Lambert Hoisting Engine Co., 115 Poinier St., Newark, N. J.

*LIDGERWOOD MFG. CO., 96 Liberty St., New York, N. Y...*p. 388*

*ROEBLING'S, JOHN A. SONS CO., Trenton, N. J...*p. 409*

CABLING AND STRANDING MACHINERY

AMERICAN INSULATING MACHINERY CO., Philadelphia, Pa...*p 638*

NEW ENGLAND BUTT CO., Providence, R. I...*p. 639*

TORRINGTON MFG. CO., Torrington, Conn. *p. 641*

CAGES

—Elevator

CONNELLSVILLE MFG. & MINE SUPPLY CO., Connellsville, Pa...*p. 384*

—Mine

CONNELLSVILLE MFG & MINE SUPPLY CO., Connellsville, Pa...*p. 384*

Eagle Iron Works, Des Moines, Ia.

Herzler & Henninger Mach. Wks., Bellville, Ill.

HOLMES, ROBT. & BROS., (Inc.), Danville, Ill...*pp. 386, 387*

OTTUMWA IRON WORKS, (Inc.), Ottumwa, Iowa..*p. 385*

Scottdale Machine & Mfg Co., Scottdale, Pa.

—Mine (Self-Dumping)

CONNELLSVILLE MFG. & MINE SUPPLY CO., Connellsville, Pa...*p. 384*

HOLMES, ROBT. & BROS., (Inc.), Danville, Ill...*pp. 386, 387*

CALENDERS

—Paper

Farrel Foundry & Machine Co., Ansonia, Conn.

Lobdell Car Wheel Co., P. O. Box 965, Wilmington, Del

—Rubber Working

Allen Machine Co., Erie, Pa.

CALORIMETERS

Emerson Apparatus Co., 251 Causeway St., Boston, Mass.

GRIEBEL INSTRUMENT CO., Carbondale, Pa...*p. 300*

*PRECISION INSTRUMENT CO., Newark, N. J...*pp. 284, 285*

Standard Calorimeter Co., East Moline, Ill.

—Gas

*PRECISION INSTRUMENT CO., Newark, N. J...*pp. 284, 285*

Precision Scientific Co., 820-822 S. Tripp Ave., Chicago, Ill.

*SARCO CO., (Inc.), 9 Barclay St., New York, N. Y...*pp. 224, 225*

SMITH GAS ENGINEERING CO., Dayton, Ohio...*p. 94*

—Steam

Ellison, Lewis M., 214 W. Kinzie St., Chicago, Ill.

*SCHAEFFER & BUDENBERG MFG. CO., Brooklyn, N. Y...*p. 295*

CAMSHAFTS

Cleveland City Forge & Iron Co., 45th St. & Lakeside Ave., Cleveland, Ohio

VULCAN STEAM FORGING CO., 247 Rano St., Buffalo, N. Y...*p. 433*

CAN MAKING MACHINERY

Ams, Max Machine Co., 101 Park Ave., New York, N. Y.

*BLISS, E. W. CO., Brooklyn, N. Y...*pp. 438, 439*

Cameron Can Machinery Co., 240 North Ashland Ave., Chicago, Ill.

Haysman & Co., 801-805 E. Pratt St., Baltimore, Md.

Leffler, Charles & Co., 49-73 Clymer St. Brooklyn, N. Y.

Ca

Digitized by Google

McDonald Machine Co., 7600 So. Racine Ave., Chicago, Ill.
Stecher, Chas. Co., 2301-13 North Knox Ave., Chicago, Ill.

CAN WASHING MACHINES
Rice & Adams Corp'n, 180 Chandler St., Buffalo, N Y.

CANDY MAKING MACHINERY
National Equipment Co., Springfield, Mass.
UNION ENGINEERING CO., Cleveland, Ohio..*p. 645*

CANNING MACHINERY
Burpee & Letson, (Ltd.), So. Bellingham, Wash.
Dyett, Frank J. Co., 73 John St., Ilion, N. Y.

CAPSTANS
Chase Machine Co., 2313 Elm St., N. W. Cleveland, Ohio
Flory, S. Mfg. Co., Bangor, Pa.
Red Wing Iron Works, Red Wing, Minn.

—Electric
MORRIS, HERBERT, (Inc.), 1-15 Lawrence Place, Buffalo, N. Y...*p. 402*

CAR DUMPERS
FULTON IRON WORKS CO., St. Louis, Mo. *p 37*
McMyler Interstate Co., Bedford, Ohio
Robbins Engineering Co., Old Colony Bldg., Chicago, Ill.
WELLER MFG. CO., 1820-1856 N. Kostner Ave., Chicago, Ill...*p. 381*

CAR HAULERS
Fairmont Mining Machinery Co., Fairmont, W. Va.
JEFFREY MFG. CO , 904 N. 4th St., Columbus, Ohio..*pp. 376, 377*

CAR LIFTS, MINE (Automatic)
CONNELLSVILLE MFG. & MINE SUPPLY CO., Connellsville, Pa...*p. 384*
HOLMES, ROBT. & BROS., (Inc.), Danville, Ill...*pp. 386, 387*

CAR PULLERS
—Belt Driven
WELLER MFG. CO., 1820-1856 N. Kostner Ave , Chicago, Ill...*p. 381*

—Electric
BARTLETT, C. O. & SNOW CO., Cleveland, Ohio..*p. 367*
Flory, S. Mfg. Co., Bangor, Pa.
*JONES, W. A. FOUNDRY & MACHINE CO., 4415 West Roosevelt, Road, Chicago, Ill...*pp. 312, 313, 314, 315*
*LIDGERWOOD MFG. CO , 96 Liberty St., New York, N. Y...*p. 388*
MORRIS, HERBERT, (Inc.), 1-15 Lawrence Place, Buffalo, N. Y..*p. 402*
Toledo Foundry & Machine Co., Toledo, Ohio
Union Iron Works, 600 E. William St., Decatur, Ill.
WELLER MFG. CO., 1820-1856 N. Kostner Ave., Chicago, Ill:..*p. 381*

CAR SHOP MACHINERY
Greenlee Bros. & Co., Rockford, Ill.

CARBIDE (Cake Form)
Carbic Mfg. Co., Duluth, Minn.
Metals Welding Co., 4400 Perkins Ave., Cleveland, Ohio

CARBON (Black Diamonds)
Diamond Drill Carbon Co., 61 Park Row, New York, N Y.

CARBON PLANTS
HOPE ENGINEERING & SUPPLY CO., Mt. Vernon, Ohio..*p. 49*

CARBONIC ACID GAS
Wittenmeier Machinery Co., 852 N. Spaulding Ave., Chicago, Ill.

CARBONIC ACID GAS MACHINES
AUTOMATIC CARBONIC MACHINE CO., Peoria, Ill...*p. 628*

CARBONDALE MACHINE CO., Carbondale, Pa...*p. 630*

CARBURETORS
Holley Bros. Co., 131 Rowena St., Detroit, Mich.

CARBURIZING
*AMERICAN METAL TREATMENT CO., Elizabeth, N. J...*p 535*
DOVE-SMITH & SON, Niagara Falls, N. Y. *p. 492*

CARRIERS
—Cash and Parcel
Baldwin, Jas. L. & Co., 350-366 Madison St., Chicago, Ill.
LAMSON CO., 100 Boylston St., Boston, Mass...*pp. 378, 379*
Standard Carrier Co , 112 E. 41st St., New York, N. Y.
Universal Tube Co., 142-152 W. Ohio St., Chicago, Ill.

—Pneumatic
(See Tubes, Pneumatic)

CARS
—Ballast
Rodger Ballast Car Co., 523 Railway Exchange, Chicago, Ill.

—Bottom Dump
Easton Car & Construction Co., Room 679, 50 Church St., New York
National Dump Car Co., 523 Railway Exchange Bldg., Chicago, Ill.

—Charging
Easton Car & Construction Co., Room 679, 50 Church St , New York

—Cinder and Slag
Pollock, Wm. B. Co., Youngstown, Ohio
Weimer Machine Works Co., Lebanon, Pa.

—Coal and Ash
CONNELLSVILLE MFG. & MINE SUPPLY CO., Connellsville, Pa...*p. 384*
Easton Car & Construction Co., 679-50 Church St., New York, N. Y.
Rodger Ballast Car Co , 523 Railway Exchange, Chicago, Ill.

—Concreting (Gasoline)
McKeen Motor Car Co., 1222 Webster St., Omaha, Nebr.

—Dump
CONNELLSVILLE MFG. & MINE SUPPLY CO., Connellsville, Pa...*p. 384*
Easton Car & Construction Co., Room 679, 50 Church St., New York
Kilbourne & Jacobs Mfg. Co., Cor. Lincoln & 4th St., Columbus, Ohio
Koppel Industrial Car & Equipment Co , Koppel, Beaver Co., Pa.
National Dump Car Co., 523 Railway Exchange Bldg., Chicago, Ill.
Wason Mfg. Co., Springfield, Mass.
Watt Mining Car Wheel Co., Barnesville, Ohio

—Freight
Mt. Vernon Car Mfg. Co., Mt Vernon, Ill.
National Dump Car Co., 523 Railway Exchange Bldg., Chicago, Ill.
Pressed Steel Car Co., Pittsburgh, Pa.
Ralston Steel Car Co., Columbus, Ohio

—Industrial Railway
Atlas Car & Mfg. Co., Ivanhoe Rd., Cleveland, Ohio
Biehl Iron Works, (Inc.), Reading, Pa.
Chase Foundry & Mfg Co., Columbus, Ohio
Chattanooga Car & Foundry Co., Chattanooga, Tenn.
Easton Car & Construction Co., Room 679, 50 Church St., New York, N. Y.
HUNT, C. W. CO., (Inc.), West New Brighton, Staten Island, N. Y...*pp. 374, 375*

Digitized by Google

Insley Mfg. Co., E. St. Clair & Onley Sts., Indianapolis, Ind.
International Clay Machinery Co., 1057 Bohlender Ave., Dayton, Ohio
Kilbourne & Jacobs Mfg. Co., Cor. Lincoln & 4th Sts., Columbus, Ohio
Koppel Industrial Car & Equipment Co., Koppel, Beaver Co., Pa.
Lakewood Engineering Co., Cleveland, Ohio
Sackett, H. B. Screen & Chute Co , 1679-1691 Elston Ave., Chicago, Ill.
Sanford-Day Iron Works, Knoxville, Tenn.
Star Car & Foundry Co., Huntington, W. Va.
Stuart, (R. J. & T. H.) Foundry & Machine Works, New Hamburg, N. Y.
STUEBNER, G. L. IRON WORKS, Hancock St. & Vernon Ave., Long Island City, N. Y...*p. 408*
Turl Iron & Car Co., (Inc.), 50 Broad St., New York, N. Y.
Watt Mining Car Wheel Co., Barnesville, Ohio

—Ingot
Easton Car & Construction Co., Room 679, 50 Church St., New York, N. Y

—Logging
Russell Wheel & Foundry Co., Detroit, Mich.
Union Iron Works, Co., Selma, Ala.

—Mine
Associated Engineering Co., Somerset, Ky.
Biehl Iron Works, (Inc.), Reading, Pa.
Brownsville Foundry & Machine Co., South Brownsville, Pa.
Chrisman Foundry Co., Morgantown, W. Va
Eagle Iron Works, Des Moines, Iowa
Easton Car & Construction Co., Room 679, 50 Church St., New York, N. Y.
Hefner & Maysilles, Grafton, W. Va.
Helmick Foundry & Machine Co., Fairmont, W. Va.
*HENDRICK MFG. CO., Carbondale, Pa. *p 653*
Herzler & Henninger Mach. Wks., Bellville, Ill.
Hockensmith Wheel & Mine Car Co., Penn Station, Pa.
Koppel Industrial Car & Equipment Co., Koppel, Beaver Co., Pa.
Lake Shore Engine Works, Marquette, Mich.
LEBANON BOILER WORKS, (J. K. Petty & Co., Inc.), 6 So. 15th St , Philadelphia, Pa...*pp. 78, 79*
OTTUMWA IRON WORKS, (Inc.), Ottumwa, Iowa..*p. 385*
Pressed Steel Car Co., Pittsburgh, Pa.
Punxsutawney Foundry & Machine Co., Punxsutawney, Pa.
Ralston Steel Car Co., Columbus, Ohio
Sanford-Day Iron Works, Knoxville, Tenn.
Star Car & Foundry Co., Huntington, W. Va
Steele, J. C. & Sons, Statesville, N. C.
Watt Mining Car Wheel Co., Barnesville, Ohio

—Platform
Easton Car & Construction Co., Room 679, 50 Church St., New York, N. Y.

—Railroad
Barney & Smith Car Co., Dayton, Ohio
Bettendorf Co., Bettendorf, Iowa
Bradley, Osgood Car Co., Worcester, Mass
Brill, J. G. Co., Philadelphia, Pa.
Cambria Steel Co., Philadelphia, Pa.
Chattanooga Car & Foundry Co., Chattanooga, Tenn.
Harlan & Hollingsworth Corp'n, Wilmington, Del.
Haskell & Barker Car Co., Chicago, Ill.
Keith Car & Mfg. Co., Sagamore, Mass
Laconia Car Co., Laconia, N. H.
Pressed Steel Car Co., Pittsburgh, Pa.
Pullman Co., Pullman Bldg., Chicago, Ill.
Ralston Steel Car Co., Columbus, Ohio
St. Louis Car Co., St. Louis, Mo
Standard Steel Car Co., Pittsburgh, Pa.
Wason Mfg. Co., Springfield, Mass.
Youngstown Steel Car Co., Niles, Ohio

—Railroad Motor
Buda Co., 606 Railway Bldg., Chicago, Ill.
FAIRBANKS-MORSE & CO , 900 S. Wabash Ave., Chicago, Ill...*p. 41*
Fairmont Gas Engine & Railway Motor Car Co., North Main St., Fairmont, Minn.
Hall-Scott Motor Car Co., Inc., Crocker Bldg., San Francisco, Cal.
Unit Railway Car Co., 32 Alger St., So. Boston, Mass.

—Railroad (Wood)
Bradley, Osgood Car Co., Worcester, Mass

—Sand Blast
*PANGBORN CORP'N, P. O. Box 859, Hagerstown, Md...*pp. 636, 637*

—Scale
Hoover & Mason, 1407 Railway Exchange, Chicago, Ill.

—Sugar Cane
Koppel Industrial Car & Equipment Co., Koppel, Beaver Co., Pa.

—Transformer
Easton Car & Construction Co., Room 679, 50 Church St., New York, N. Y.

—Trolley (Industrial Railway)
HUNT, C. W. Co., (Inc.), West New Brighton, Staten Island, N. Y...*pp. 374, 375*
Shevlin Engineering Co., Inc., 103 W. 34th St., New York, N. Y.
Wason Mfg. Co., Springfield, Mass.

CARTON MAKING MACHINERY
Robinson, John T. Co , Hyde Park Sta., Boston, Mass.

CARTON SEALING MACHINES
Automatic Weighing Machine Co., 134-140 Commerce St., Newark, N. J.
Bird Machine Co., Neponset St., So. Walpole, Mass.
National Packaging Machinery Co., 174 Green St., Jamaica Plain, Boston, Mass.
UNION ENGINEERING CO., Cleveland, Ohio ..*p. 645*

CARTS (Hand Dump)
STUEBNER, G. L. IRON WORKS, Hancock St. & Vernon Ave., Long Island City, N. Y...*p. 408*

CASE HARDENING
*AMERICAN METAL TREATMENT CO., Elizabeth, N. J...*p. 535*
Kotten Machine Co., West Side Ave. & Penn. R. R., Jersey City, N. J.
Matthews Mfg. Co., 104 Gold St., Worcester, Mass.
WILLIAMS, J. H. & CO., 70 Richards St., Brooklyn, N. Y...*p. 517*

CASH AND PARCEL CARRIERS
(See Carriers, Cash and Parcel)

CASING, STEAM PIPE
(See Coverings, Steam Pipe)

CASINGS, STEEL (Boiler)
BROWNELL CO., Dayton Ohio..*p. 59*
*CASEY-HEDGES CO., Chattanooga, Tenn *pp. 60, 61*
HONHORST, JOS. CO., 1016-20 W. 6th St., Cincinnati, Ohio..*p. 654*
*VOGT, HENRY MACHINE CO., Louisville, Ky...*pp. 632, 633*
Walton & Son, C. J., 1221 W. Main St., Louisville, Ky
*WICKES BOILER CO., Saginaw, Mich...*p. 93*

Ca

Digitized by Google

CASTERS

—Truck

Clark, Geo. P. Co., Windsor Locks, Conn.
Payson Manufacturing Co., 2920 W. Jackson Blvd., Chicago, Ill.

—Truck (Leather Tread)

Buffalo Pulley & Caster Co., 182 Breckenridge St., Buffalo, N. Y

CASTING MACHINES

—Die

Indiana Die Casting Co., 11th & Cornell Sts., Indianapolis, Ind.
Precision Casting Co., (Inc.), P. O. Drawer 47, Syracuse, N. Y.

—Pig Iron

Heyl & Patterson, Inc., 51 Water St., Pittsburgh, Pa.
Pittsburgh Coal Washer Co , Fulton Bldg., Pittsburgh, Pa.
POOLE ENGINEERING & MACHINE CO., Woodberry, Baltimore, Md...*pp. 316, 317*

CASTINGS

—Acid-Resistant

Alloy Foundry and Machine Corp'n, New Rochelle, N. Y.
Buffalo Foundry & Machine Co., 41 Winchester Ave., Buffalo, N. Y.
Chemical Pump & Valve Co., 327 Gifford St., Perth Amboy, N. J.
Duriron Co , (Inc.), Dayton, Ohio
FARRAR & TREFTS, Buffalo, N. Y...*p. 652*
Fillmore Ave. Fndry. & Iron Works, (Inc.), 153 Fillmore Ave., Buffalo, N. Y.
*FULLER-LEHIGH CO., Fullerton, Pa...*p. 128*
German Bronze Co., Erie, Pa.
KELLY & JONES CO., Greensburg, Pa...*pp. 182, 183*
Nassau Valve & Pump Co., Inc., Rockville Center, L. I., N. Y.
SCOTT VALVE MFG. CO., Detroit, Mich. *p. 191*
Standard Calorimeter Co., East Moline, Ill.
*U. S. CAST IRON PIPE & FOUNDRY CO , Burlington, N. J...*pp. 232, 233*

—Alloy Steel

Sivyer Steel Casting Co., 37th Ave. & Mitchell St., Milwaukee, Wis.

—Aluminum

ACME DIE CASTING CORP'N, 35th St. & 3rd Ave., Brooklyn, N. Y...*p. 424*
Alloy Foundry and Machine Corp'n, New Rochelle, N Y.
Aluminum Manufactures, Inc., (''Lynite''), 6205 Carnegie Ave., Cleveland, Ohio
BUCKEYE IRON & BRASS WORKS, Dayton, Ohio..*p. 168*
BUDD GRATE CO., 2013 E. Letterly St., Philadelphia, Pa...*p. 123*
D'ESTE, JULIAN CO., 26 Canal St., Boston, Mass...*pp. 206, 207*
*DOEHLER DIE-CASTING CO., Brooklyn, N. Y...*p. 426*
Franklin Mfg. Co., H. H., Syracuse, N. Y.
*JOHNSON BRONZE CO., New Castle, Pa. *p. 338*
Keystone Bronze Co., 39th St., Pittsburgh, Pa
Lee Co., Wm. O., Port Huron, Mich.
Legler-Eilerman Co., Dayton, Ohio
Light Mfg. & Foundry Co., Pottstown, Pa.
MUELLER METALS CO., Port Huron, Mich. *p. 428*
Parker White-Metal & Machine Co., 23rd & Penna. Ave., Erie, Pa
Precision Castings Co., (Inc.), P. O. Drawer 47, Syracuse, N. Y.
SCOTT VALVE MFG. CO., Detroit, Mich. *p. 191*
Stewart Mfg. Corp'n, Wells St. Bridge, Chicago, Ill.
Wedlake-Lamson Co., Hoboken, N. J.

—Brass and Bronze

ALLAN, A. & SON, Harrison, N. J...*p. 413*
Alloy Foundry and Machine Corp'n. New Rochelle, N. Y.
Aluminum Manufactures, Inc., (''Lynux''), 6205 Carbegie Ave., Cleveland, Ohio
American Bronze Corp'n, (''Non-Gran''), Berwyn, Pa
AMERICAN INJECTOR CO., Detroit, Mich. *p. 217*
American Lubricator Co., Detroit, Mich.
AMERICAN MANGANESE BRONZE CO., (''Hy-ten-Sl''), Holmesburg, Philadelphia, Pa...*p. 415*
AMERICAN TOOL & MACHINE CO., Boston 9, Mass...*p. 614*
BUCKEYE IRON & BRASS WORKS, Dayton, Ohio..*p. 168*
BUDD GRATE CO., 2013 E. Letterly St., Philadelphia, Pa...*p. 123*
Buffalo Bronze Die Cast Corp'n, 100 Arthur St., Buffalo, N. Y.
Burpee & Letson, (Ltd.), So. Bellingham, Wash.
CLOW, JAMES B. & SONS, 534 So. Franklin St., Chicago, Ill...*pp 230, 231*
Columbian Bronze Corp'n, 50 Church St., New York
Damascus Bronze Co., Pittsburgh, Pa.
D'ESTE, JULIAN CO., 26 Canal St., Boston, Mass...*pp. 206, 207*
Diamond Manufacturing Co., Wyoming, Pa.
*DOEHLER DIE-CASTING CO., (''Do-Di''), Brooklyn, N. Y ..*p. 426*
Eastwood Wire Mfg. Co., Belleville, N. J.
ECONOMY PUMPING MACHINERY CO., 104-118 No. Curtis St., Chicago, Ill...*p. 568*
Electric Water Sterilizer & Ozone Co., Scottdale, Pa.
Hercules Float Works, 200 Franklin St., Springfield, Mass.
Eynon-Evans Corp'n, 15th & Clearfield Sts , Philadelphia, Pa.
Germann Bronze Co., Erie, Pa.
Grand Rapids Brass Co., 90 Scribner Ave., N. W., Grand Rapids, Mich.
Hill Pump Valve Co., Belmont & Knox Ave., Chicago, Ill.
HOLMES, ROBT & BROS., (Inc.), Danville, Ill...*pp. 386, 387*
KELLY & JONES CO., Greensburg, Pa...*pp. 182, 183*
Keystone Bronze Co., 39th St., Pittsburgh, Pa.
Lee Co., Wm. O., Port Huron, Mich.
LUMEN BEARING CO., Buffalo, N. Y ..*p. 416*
*LUNKENHEIMER CO., Cincinnati, Ohio *pp. 184, 185, 186, 187, 188, 189*
MILWAUKEE DIE CASTING CO., 297 Fourth St., Milwaukee, Wis...*p. 427*
MUELLER METALS CO., Port Huron, Mich...*p. 428*
NEWBURGH STEAM BOILER WORKS, (P. Delany & Co.), Newburgh, N. Y ..*p. 64*
Niagara Brass Mfg. Co., (Inc.), 163 Adams St., Buffalo, N. Y.
Nolte Brass Co., Springfield, Ohio
Pacific Metal Works, 153 First St., San Francisco, Cal.
*PITTSBURGH VALVE FOUNDRY & CONSTRUCTION CO., P. O. Box 1016, Pittsburgh, Pa ..*pp. 192, 193*
*POOLE ENGINEERING & MACH. CO., Woodberry, Baltimore, Md...*pp. 316, 317*
Punxsutawney Foundry & Machine Co., Punxsutawney, Pa.
*RICHARDSON-PHENIX CO., 126 Reservoir Ave., Milwaukee, Wis...*pp. 248, 249*

Digitized by Google

SANDUSKY FOUNDRY & MACHINE CO., Sandusky, Ohio..*p. 646*
SCOTT VALVE MFG. CO., Detroit, Mich *p. 191*
VALLEY IRON WORKS CO., Appleton, Wis. *p. 647*
Vanadium Metals Co., Groton, Conn.
Wedlake-Lamson Co., Hoboken, N. J.

—Copper

BUCKEYE IRON & BRASS WORKS, Dayton, Ohio ..*p. 168*
D'ESTE, JULIAN CO., 26 Canal St., Boston, Mass ..*pp. 206, 207*
Keystone Bronze Co., 39th St., Pittsburgh, Pa.
LUMEN BEARING CO., Buffalo, N. Y...*p. 416*

—Die-Molded

ACME DIE CASTING CORP'N, 36th St. & 3rd Ave., Brooklyn, N. Y...*p. 424*
Alemite Die-Casting & Mfg. Co., 2640-2654 Belmont Ave., Chicago, Ill.
American Bearing & Die Casting Corp'n, 212 W. McCarty St., Indianapolis, Ind.
AMERICAN BRASS CO., Waterbury, Conn. *p. 414*
American Type Founders Co., 300 Communipaw Ave., Jersey City, N. J.
*BARNHART BROTHERS & SPINDLER, (''Tenso''), Monroe & Throop Sts., Chicago, Ill...*p. 425*
Buffalo Bronze Die Cast Corp'n, 100 Arthur St., Buffalo, N Y.
Die Casting Co. of New Jersey, Irvington, N. J.
*DOEHLER DIE-CASTING CO., Brooklyn, N. Y...*p. 426*
Franklin Mfg. Co., H. H., Syracuse, N. Y.
Germann Bronze Co , Erie, Pa.
Indiana Die Casting Co., 11th & Cornell Sts., Indianapolis, Ind.
Legler-Eilerman Co., Dayton, Ohio
Light Mfg. & Foundry Co., Pottstown, Pa.
Lubricating Metal Co., (''Noheet''), 2 Rector St., New York
Michigan Smelting & Refining Co., Detroit, Mich.
MILWAUKEE DIE CASTING CO., 297 Fourth St , Milwaukee, Wis...*p. 427*
Moberg, Inc., C. J., Mount Vernon, N. Y.
Mount Vernon Die Casting Corp'n, 118 Pearl St., Mt. Vernon, N. Y.
MUELLER METALS CO., Port Huron, Mich. *p. 428*
Phoenix Die Casting Co., 21 Illinois St., Buffalo, N Y.
Precision Castings Co., (Inc.), P. O. Drawer 47, Syracuse, N. Y.
Stewart Mfg. Corp'n, Wells St. Bridge, Chicago, Ill.

—Heavy

BERTSCH & CO., Cambridge City, Ind. *p. 442*
Carthage Machine Co., Carthage, N. Y
*FULLER-LEHIGH CO., Fullerton, Pa...*p. 128*
Hardie-Tynes Mfg. Co., 8th Ave. & 28th St., Birmingham, Ala.
Hilles & Jones Co., Wilmington, Del.
LYNCHBURG FOUNDRY CO., Lynchburg, Va...*p. 229*
Newbold & Son Co., R. S., Norristown, Pa.
Reliance Steel Casting Co., 28th & Smallman Sts., Pittsburgh, Pa.
Union Steel Casting Co., 62nd & Butler Sts., Pittsburgh, Pa.
*U. S. CAST IRON PIPE & FOUNDRY CO., Burlington, N J...*pp. 232, 233*

—Hydraulic

Alloy Foundry and Machine Corp'n, New Rochelle, N. Y.
Federal Steel Foundry Co., Chester, Pa.
*U. S. CAST IRON PIPE & FOUNDRY CO., Burlington, N. J...*pp. 232, 233*

—Iron

Abramsen Engineering Co., Union Bank Bldg., Pittsburgh, Pa.
Allison & Co., Chester, Pa
American Car & Foundry Co.. 165 Broadway, New York
AMERICAN TOOL & MACHINE CO., Boston 9, Mass...*p. 614*
Anderson Foundry & Machine Co., Anderson, Ind.
BASS FOUNDRY & MACHINE CO., Fort Wayne, Ind...*p. 57*
Bay City Foundry & Machinery Co., 26th & Water Sts., Bay City, Mich.
BERTSCH & CO., Cambridge City, Ind ..*p. 442*
Best Steel Casting Co., 1404 Hobart Bldg., San Francisco, Cal.
Birmingham Iron Foundry, Derby, Conn.
Blairsville Iron Works, Blairsville, Pa.
Bosworth Ard Mach. & Foundry Co., Anniston, Ala.
Brady, James A. Foundry Co.. 45th St. & Western Blvd., Chicago, Ill
Bretting Mfg. Co., C. G., Ashland, Wis.
*BROWN, A. & F. CO., 79 Barclay St., New York...*p. 303*
Brown Clutch Co., Sandusky, Ohio
BUCKEYE IRON & BRASS WORKS, Dayton, Ohio..*p. 168*
BUDD GRATE CO., 2013 E. Letterly St., Philadelphia, Pa...*p. 123*
Buffalo Foundry & Machine Co., 41 Winchester Ave., Buffalo, N. Y.
*BUILDERS IRON FOUNDRY, (''Globe Special''), Providence, R. I...*p. 277*
Burhorn, Edwin Co., 25 West Broadway, New York
Burpee & Letson, (Ltd.), So. Bellingham, Wash.
*CALDWELL, H. W. & SON CO., 17th St. & Western Ave., Chicago, Ill...*p. 370*
Canton Grate Co., 1711 Dillon Place, Canton, Ohio
*CASEY-HEDGES CO., Chattanooga, Tenn. *pp. 60, 61*
*CENTRAL FOUNDRY CO., 90 West St., New York, N. Y...*p. 228*
Central Iron Works, Stevens Point, Portage Co., Wis.
Centre Foundry & Machine Co., Wheeling, W. Va.
Chattanooga Car & Foundry Co., Chattanooga, Tenn.
Chester Steel Casting Co., Chester, Pa.
Chickasaw Machine & Foundry Co., Memphis, Tenn.
Chrismann-Goodwin Foundry Co., Morgantown, W. Va.
Clayville Foundry & Machine Co., (Inc.), Clayville, N. Y.
CLOW, JAMES B. & SONS, 534 So. Franklin St., Chicago, Ill...*pp. 230, 231*
*COLE, R. D. Mfg. Co., Newman, Ga...*p. 63*
Cox & Sons Co., 519 Lafayette Place, Philadelphia, Pa.
Currier & Sons, Cyrus, Newark, N. J.
Cutter, Geo. A., Taunton, Mass.
Dake Engine Co., Grand Haven, Mich.
Direct Separator Co., Syracuse, N. Y.
Dominion Engineering Works, (Ltd.), P. O. Box 2799, Montreal, Quebec, Canada
Eastwood Co., Benj., 300 Straight St., Paterson, N. J.
ECONOMY PUMPING MACHINERY CO., 104-118 No. Curtis St., Chicago, Ill ..*p. 568*
Fairmount Foundry & Engineering Works, 43 Second Ave., Woonsocket, R. I.
*FALLS CLUTCH & MACHINERY CO., Cuyahoga Falls, Ohio..*p. 330*

Digitized by Google

FARRAR & TREFTS, Buffalo, N. Y...*p. 652*
Fillmore Ave. Foundry & Iron Works, (Inc.), 153 Fillmore Ave., Buffalo, N. Y.
Fraim, E. T. Lock Co., Lancaster, Pa.
Foster, Merriam & Co., Meriden, Conn.
Fox Hill Foundry, Clinton, Grand & 12th Sts., Hoboken, N. J.
FRANKLIN MACHINE CO., P. O. Address, Box 1393, Providence, R. I...*p. 9*
Frederick Iron & Steel Co., Frederick, Md.
*FULLER-LEHIGH CO., Fullerton, Pa...*p. 128*
FULTON IRON WORKS CO., St. Louis, Mo. *p. 37*
Gale Mfg. Co., Albion, Mich.
Gardner General Foundry Co., Gardner, Mass.
*GIFFORD-WOOD CO., Hudson, N. Y...*p. 372*
Glover Bros., Frankford, Philadelphia, Pa.
Goodnow Foundry Co., L. H., Fitchburg, Mass.
Great Lakes Engineering Works, River Rouge, Mich.
Hanson Clutch & Machinery Co., Tiffin Ohio
Harley Co., Page Boulevard, Springfield, Mass.
Harrisburg Foundry & Machine Works, Harrisburg, Pa.
Hart-Parr Co., Charles City, Iowa
Havana Mfg. Co., Havana, Ill.
Hefner & Maysilles, Grafton, W. Va.
Hershey Machine & Foundry Co., Manheim, Pa.
Hewes & Phillips Iron Works, Newark, N. J.
*HILL CLUTCH CO., Cleveland, Ohio..*p. 331*
HOLMES, ROBT. & BROS., (Inc.), Danville, Ill...*pp. 386, 387*
HOOVEN, OWENS, RENTSCHLER CO., Hamilton, Ohio..*p. 10*
Hubbard Steel Fndry. Co., Railroad Ave., East Chicago, Ill.
Hyde Park Foundry & Machine Co., Hyde Park, Pa.
Ide, A. L. & Sons, 311 N. 5th St., Springfield, Ill.
Independent Foundry Co., 741 York St., Portland, Ore.
JEFFREY MFG. CO., 904 N. 4th St., Columbus, Ohio..*pp. 376, 377*
*JONES, W. A. FOUNDRY & MACHINE CO., 4415 West Roosevelt Road, Chicago, Ill...*pp. 312, 313, 314, 315*
Johnson & Jennings Co., E. 65th St. & N. Y. C. R. R., Cleveland, Ohio
*JOLLY, J. & W. (Inc.), Holyoke, Mass... *p. 32*
Judson Governor Co., Rochester, N. Y.
KELLY & JONES CO., Greensburg, Pa... *pp. 182, 183*
Kline Hardware Co., Allentown, Pa.
Kling Bros. Engineering Works, 1300 N. Kostner Ave., Chicago, Ill.
Klotz Machine Co., 318 W. Water St., Sandusky, Ohio
Kutztown Foundry & Machine Co., 421 Chestnut St., Philadelphia, Pa.
Lake Erie Engineering Works, Buffalo, N. Y.
Lane & Bodley Co., Bond Hill, Cincinnati, Ohio
Leavitt Mfg. Co., 208-210 Griggs St., Urbana, Ill.
LIDGERWOOD MFG. CO., 96 Liberty St., New York, N. Y...*p. 388*
Lobdell Car Wheel Co., P. O. Box 965, Wilmington, Del.
Lumsden & Van Stone Co., 426 First St., South Boston Mass.
*LUNKENHEIMER CO., Cincinnati, Ohio.. *pp. 184, 185, 186, 187, 188, 189*
Lycoming Motors Corp'n, Williamsport, Pa.
LYNCHBURG FOUNDRY CO., Lynchburg, Va...*p. 229*
McCLAVE-BROOKS CO., Scranton, Pa...*p. 126*
McCord & Co., 1905 People's Gas Bldg., Chicago, Ill.
McLain's System, (Inc.), 802 Goldsmith Bldg., Milwaukee, Wis.
McNaughton Mfg. Co., Maryville, Tenn.
Mecklenburg Iron Works, Charlotte, N. C.
Michigan Machine Tool & Fdry. Co., Ypsilanti, Mich.
Munson, E. G., Carton Ave., Utica, N. Y.
MURRAY IRON WORKS CO., Burlington, Iowa..*pp. 80, 81*
Meyerstown Foundry & Mfg. Co., Inc., 90 West St., New York
National Foundry Mfg. & Supply Co., Williamsport, Pa.
Nazareth Foundry & Machine Co., 41-45 Easton Road, Nazareth, Pa.
Neemes Bros., (Inc.), 218 1st St., Troy, N. Y.
Nelsonville Foundry & Machine Co., Nelsonville, Ohio
NEWBURGH STEAM BOILER WORKS, (P. Delany & Co.), Newburgh, N. Y...*p. 64*
NEW ENGLAND BUTT CO., Providence, R. I...*p. 639*
Park Mfg. Co., Charlotte, N. C.
Pettis Co., W. W., Suite 416-17 First Nat'l Bank Bldg., Cincinnati, Ohio
Phoenix Iron Works Co., Meadville, Pa.
*PITTSBURGH VALVE FOUNDRY & CONSTRUCTION CO., P. O. Box 1016, Pittsburgh, Pa...*pp. 192, 193*
Plamondon, A. Mfg. Co., 5300 Western Boul., Chicago, Ill.
POOLE ENGINEERING & MACHINE CO., Woodberry, Baltimore, Md...*pp. 316, 317*
Punxsutawney Foundry & Machine Co., Punxsutawney, Pa.
Pyramid Iron Products Corp'n, 2 Rector St., New York, N. Y.
Reading Iron Co., Reading, Pa.
ROBINS CONVEYING BELT CO., Park Row Bldg., New York, N. Y...*p. 373*
Russel Wheel & Foundry Co., Detroit, Mich.
Snead & Co., Iron Works, Foot of Pine St., Jersey City, N. J.
Speidel, J. G., Reading, Pa.
Standard Engineering Co., Ellwood City, Pa.
STEACY-SCHMIDT MFG. CO., York, Pa. *p. 612*
Sterrit-Thomas Co., 32nd & Smallman Sts., Pittsburgh, Pa.
Stuart Foundry & Machine Works, R. J. & T. H., New Hamburg, N. Y.
TEXTILE MACHINE WORKS, Reading, Pa. *p. 644*
Thompson & Co., J., Van Horn & Sophia Sts., Philadelphia, Pa.
Townsend Furnace & Machine Co., Broadway & Rensselaer St., Albany, N. Y.
Treadwell Engrg. Co., 140 Cedar St., New York, N. Y.
Union Iron Works, Co., Selma, Ala.
Union Mfg. Co., New Britain, Conn.
United Engineering & Foundry Co., Farmer's Bank Bldg., Pittsburgh, Pa.
*U. S. CAST IRON PIPE & FOUNDRY CO., Burlington, N. J...*pp. 232, 233*
VALLEY IRON WORKS CO., Appleton, Wis. *p. 647*
*VILTER MFG. CO., 1194-1196 Clinton St., Milwaukee, Wis...*pp. 16, 17*
*VOGT, HENRY MACHINE CO., Louisville, Ky...*pp. 632, 633*
Vulcan Iron Works, 1849 Kearney St., San Francisco, Cal.
Warren Foundry & Machine Co., 11 Broadway, New York, N. Y.
*WASHBURN & GRANGER, (Inc.), 50 Church St., New York, N. Y...*p. 127*

Digitized by Google

Weimer Machine Works, Co., Lebanon, Pa.
Westbrook Elevator Mfg. Co., (Inc.), Danville, Va.
West Coast Iron Works, 4601-9 Fourteenth Ave., N. W., Seattle, Wash.
Western Gas Construction Co., Fort Wayne, Ind.
Wood, Walter A. M. & R. M. Co., Hoosick Falls, N. Y.

—Lead

AMERICAN TOOL & MACHINE CO., Boston, 9 Mass...*p. 614*
United Lead Co., 111 Broadway, New York, N. Y.
VALLEY IRON WORKS CO., Appleton, Wis...*p. 647*

—Malleable Iron

Federal Malleable Co, West Allis, Wis.
Industrial Supply & Equipment Co., 407 Sansom St., Philadelphia, Pa.
JEFFREY MFG. CO., 904 N. 4th St., Columbus, Ohio..*pp. 376, 377*
KELLY & JONES CO., Greenburg, Pa...*pp. 182, 183*
MALLEABLE IRON FITTINGS CO., Branford, Conn. *p. 236*
National Malleable Castings Co., 7706 Platt Ave., Cleveland, Ohio
STOWELL CO., South Milwaukee, Wis.
Symington, T. H., 233 Broadway, New York, N. Y.
Wood, Walter A., M. & R. M. Co., Hoosick Falls, N. Y.
*ALLIS-CHALMERS MFG. CO., Milwaukee, Wis...*pp. 28, 29*
AMERICAN MANGANESE BRONZE CO., Holmesburg, Philadelphia, Pa...*p. 415*
Vanadium Metals Co., Groton, Conn.

—Manganese Steel

American Manganese Steel Co., Chicago Heights, Ill.
Taylor-Wharton Iron & Steel Co., High Bridge, N. J.

—Monel Metal

International Nickel Co., 67 Wall St., New York
Monel Metal Products Corp'n, 67 Wall St., New York, N. Y.
SCOTT VALVE MFG. CO., Detroit, Mich... *p. 191*
Supplee-Biddle Hardware Co., 512 Commerce St., Philadelphia, Pa.

—Nickel

Monel Metal Products Corpn., 67 Wall St., New York, N. Y.
SCOTT VALVE MFG. CO., Detroit, Mich... *p 191*

—Nickel Chromium

Driver-Harris Co., Harrison, N. J.
Hoskins Mfg. Co., 4437 Lawton Ave., Detroit, Mich.

—Phosphor Bronze

Nolte Brass Co., Springfield, Ohio

—Railing

KELLY & JONES CO., Greensburg, Pa...*pp. 182, 183*

—Semi-Steel

BERTSCH & CO., Cambridge City, Ind...*p. 443*
Birmingham Iron Foundry, Derby, Conn.
*BROWN, A. & F. CO., 79 Barclay St., New York...*p. 303*
Central Iron Works, Stevens Point, Portage Co., Wis.
Dominion Engrg. Works, Ltd., P. O. Box 2799, Montreal, Quebec, Canada
FARRAR & TREFTS, Buffalo, N. Y...*p. 652*
Fillmore Ave. Foundry & Iron Works, Inc., 153 Fillmore Ave., Buffalo, N. Y.
*FULLER-LEHIGH CO., Fullerton, Pa...*p. 128*
FULTON IRON WORKS CO., St. Louis, Mo. ....*p. 37*
HOOVEN, OWENS, RENTSCHLER CO., Hamilton, Ohio..*p. 10*
Independent Foundry Co., 741 York St., Portland, Ore.
JONES, W. A. FOUNDRY & MACHINE CO., 4415 West Roosevelt Road, Chicago, Ill... *pp. 312, 313, 314, 315*
KELLY & JONES CO., Greensburg, Pa...*pp. 182, 183*
*LUNKENHEIMER CO., Cincinnati, Ohio.. *pp. 184, 185, 186, 187, 188, 189*
McLain's System (Inc.), 802 Goldsmith Bldg., Milwaukee, Wis.
MALLEABLE IRON FITTINGS CO., Branford, Conn...*p. 236*
MURRAY IRON WORKS CO., Burlington, Iowa..*pp. 80, 81*
*PITTSBURGH VALVE FOUNDRY & CONSTRUCTION CO., P. O. Box 1016, Pittsburgh, Pa...*pp. 192, 193*
POOLE ENGINEERING & MACHINE CO., Woodberry, Baltimore, Md...*pp. 316, 317*
Russel Wheel & Foundry Co., Detroit, Mich.
Sterrit-Thomas Fndry Co., 32nd & Smallman Sts., Pittsburgh, Pa.
*U. S. CAST IRON PIPE & FOUNDRY CO., Burlington, N. J...*pp. 232, 233*
VALLEY IRON WORKS CO., Appleton, Wis. ..*p. 647*
*VILTER MFG. CO., 1194-1196 Clinton St., Milwaukee, Wis...*pp. 16, 17*
*VOGT, HENRY MACHINE CO., Louisville, Ky...*pp. 632, 633*

—Steel

Allison & Co, Chester, Pa.
American Steel Foundries, 1163 McCormick Bldg., Chicago, Ill.
Atlas Steel Casting Co., 1963 Elmwood Ave., Buffalo, N. Y.
Best Steel Casting Co., 1404 Hobart Bldg., San Francisco, Cal.
Bethlehem Steel Co., Bethlehem, Pa.
Birdsboro Steel Foundry & Machine Co., Birdsboro, Pa.
Chester Steel Castings Co., Chester, Pa.
Chicago Steel Foundry Co., 3720 So. Kedzie Ave., Chicago, Ill.
Columbia Steel Co., 503 Market St., San Francisco, Cal.
Duquesne Steel Foundry Co., 912 Farmers Bank Bldg., Pittsburgh, Pa.
Eagan-Rogers Steel & Iron Co.., Crum Lynne, Pa.
Erie Forge Co., Erie, Pa.
FALK CORPORATION, Milwaukee, Wis... *pp. 304, 305*
Federal Steel Foundry Co., Chester, Pa.
Gerlinger Steel Castings Co., Milwaukee, Wis.
Hart-Parr Co., Charles City, Iowa
Hubbard Steel Foundry Co., Railroad Ave., East Chicago, Ind.
Industrial Steel Casting Co., Toledo, Ohio
KELLY & JONES CO., Greensburg, Pa...*pp. 182, 183*
Lobdell Car Wheel Co., P. O. Box 965, Wilmington, Del.
Lombard Iron Work & Supply Co., Augusta, Ga.
McCord & Co., 1905 Peoples Gas Bldg., Chicago, Ill.
MALLEABLE IRON FITTINGS CO., Branford, Conn...*p. 236*
Massilon Steel Casting Co., Massillon, Ohio
Maynard Electric Steel Casting Co., Milwaukee, Wis.
National Steel Casting Co., Montpelier, Ind.
Ohio Steel Foundry Co., Springfield, Ohio
Otis Steel Co., 1140 Leaders News Bldg., Cleveland, Ohio
Penn Seaboard Steel Corp'n, Franklin Bank Bldg., Philadelphia, Pa.

Ca

Digitized by Google

Philadelphia Roll & Machine Co., 23rd St. & Washington Ave., Philadelphia, Pa.
Pittsburgh Iron & Steel Foundries Co., ("Adamite"), 314 Oliver Bldg., Pittsburgh, Pa.
Reading Steel Casting Co., Reading, Pa.
Reliance Steel Casting Co., 28th & Smallman St., Pittsburgh, Pa.
Standard Steel Works Co., 500 No. Broad St., Philadelphia, Pa.
Strong Steel Foundry Co., 33 Norris St., Buffalo N. Y.
Swedish Crucible Steel Co., Butler & Grand Trunk Ry., Detroit, Mich.
Taylor-Wharton Iron & Steel Co., High Bridge, N. J.
Treadwell Engrg. Co., 140 Cedar St., New York, N. Y.
Union Spring & Mfg. Co., 1207 Fulton Bldg., Pittsburgh, Pa.
Union Steel Casting Co., 62nd & Butler Sts., Pittsburgh, Pa.
United Engineering & Foundry Co., Farmers Bank Bldg., Pittsburgh, Pa.
Vulcan Iron Works, Wilkes-Barre, Pa.
Wharton, Wm. Jr. & Co., (Inc.), P. O. Box 124, Easton, Pa.
Wheeling Mold & Foundry Co., Wheeling, W. Va.

—Steel (Electric)
*TITUSVILLE IRON WORKS CO., Titusville, Pa...*p. 89*
Industrial Steel Casting Co., Toledo, Ohio
Maynard Electrical Steel Casting Co., Milwaukee, Wis.
Millbury Steel Fdry. Co., Millbury, Mass.
Sivyer Steel Casting Co., 37th Ave. & Mitchell St., Milwaukee, Wis.

—Vanadium Bronze
Vanadium Metals Co., Groton, Conn.

—Vanadium Steel
Sivyer Steel Casting Co., 37th Ave. & Mitchell St., Milwaukee, Wis.
Union Steel Casting Co., 62nd & Butler Sts., Pittsburgh, Pa.

—Wear-Resistant
American Abrasive Metals Co., 50 Church St., New York, N. Y.

—White Metal
ACME DIE CASTING CORP'N, 35th St. & 3rd Ave., Brooklyn, N. Y...*p. 424*
Alemite Die-Casting & Mfg. Co., 2640-2654 Belmont Ave., Chicago. Ill.
*BARNHART BROTHERS & SPINDLER, ("Tenso"), Monroe & Throop Sts., Chicago, Ill...*p. 425*
JULIAN D'ESTE CO., 26 Canal St., Boston, Mass...*pp. 206, 207*
*DOEHLER DIE-CASTING CO., Brooklyn, N. Y...*p. 426*
MUELLER METALS CO., Port Huron, Mich. ..*p. 428*
Parker White-Metal & Machine Co., 23rd & Penna. Ave., Erie, Pa.

CAUSTICIZING APPARATUS
SWENSON EVAPORATOR CO., 945 Monadnock Bldg., Chicago, Ill...*p. 611*

CELLULOID MACHINERY
Cowdrey, C. H. Machine Works, 20 Main St., Fitchburg, Mass.
Farrel Fdry. & Machine Co., Ansonia, Conn.

CEMENT
—Asbestos
*JOHNS-MANVILLE (Inc.), New York, N. Y...*p. 244*
Kennedy, Robert A. Co., 445 West St., New York, N. Y.
*KING REFRACTORIES CO., (Inc.), ("Flame Brand"), 1709 Niagara St., Buffalo, N. Y...*p. 137*

—Belt
Alexander Bros., 414 N. 3rd St., Philadelphia Pa.
Brandford Belting Co., 202 Walnut St., Cincinnati, Ohio
Grand Rapids Belting Co., 1-3 Ionia Ave., Grand Rapids, Mich.
Jewell Belting Co., Hartford, Conn.
MacWatty Belting Co., ("Stickfast"), 7 Beverly St., Providence, R. I.
Ulmer Leather Co., Norwich, Conn.

—Caulking
Clark Cast Steel Cement Co., Shelton, Conn.

—Disc Wheel
Badger Tool Co., Beloit, Wis.

—Fire Brick
Codd Tank & Specialty Co., 117 S. Hanover St., Baltimore, Md.
Hoffman, Chas. V. Co. (Inc.), ("AlSiO), 95 Liberty St., New York, N. Y.
*KING REFRACTORIES CO., (Inc.), ("Flame Brand"), 1709 Niagara St., Buffalo, N. Y...*p. 137*

—Iron and Steel
Clark Cast Steel Cement Co., Shelton, Conn.
Smooth-On Mfg. Co., 570-574 Communipaw Ave., Jersey City, N. J.

—Pipe Joint
Chard & Howe, ("Deegan's"), 250 Front St., New York
*CRANE CO., 836 S. Michigan Ave., Chicago, Ill...*pp. 170, 171, 172, 173*
*JOHNS-MANVILLE (Inc.), New York, N. Y...*p. 244*
Smooth-On Mfg. Co... 570-574 Communipaw Ave., Jersey City, N. J.
United States Graphite Co., Saginaw, Mich

—Pipe Joint (Graphite)
KEY BOILER EQUIPMENT CO., 27th & McCasland Ave., East St. Louis, Ill...*pp. 100, 101*

—Refractory
Betson Plastic Fire Brick Co., (Inc.), ("Hi-Heat"), Box 368-A, Rome, N. Y.
Botfield Specialties Co., ("Adamant"), 776 S. Swanson St., Philadelphia, Pa.
*CELITE PRODUCTS CO., 11 Broadway, New York, N. Y...*p. 135*
Hofman Engineering Co. (Inc.), 557 559 W. Quincy St., Chicago, Ill.
*JOHNS-MANVILLE (Inc.), New York, N. Y...*p. 244*
*KING REFRACTORIES CO., (Inc.), ("Flame Brand"), 1709 Niagara St., Buffalo, N. Y...*p. 137*
Pitts & Kitts Mfg. & Supply Co., ("Bondite"), 50 Park Place, New York, N. Y.
*QUIGLEY FURNACE SPECIALTIES CO., (Inc.), ("Hytempite"), 26 Cortlandt St., New York, N. Y...*pp. 129, 138, 139*
Smooth-On Mfg. Co., 570-574 Communipaw Ave., Jersey City, N. J.

—Silica
Mt. Union Refractories Co., Mt. Union, Pa.

—Water Res'stant
Smooth-On Mfg. Co., 570-574 Communipaw Ave., Jersey City, N. J.
Union Fibre Co., Winona, Minn.

CEMENT MAKING MACHINERY
*ALLIS-CHALMERS MFG. CO., Milwaukee, Wis...*pp. 28, 29*
BONNOT CO., Canton, Ohio..*p. 598*
Fuller Engineering Co., Allentown National Bank Bldg., Allentown, Pa.
*FULLER-LEHIGH CO., Fullerton, Pa...*p. 128*
*HILL CLUTCH CO., Cleveland, Ohio..*p. 351*
Reeves Bros. Co., Box K, Alliance, Ohio
RUGGLES-COLES ENGINEERING CORP'N, 120 Broadway, New York, N. Y...*p. 609*

Digitized by Google

*SMIDTH, F. L. & CO., 50 Church St., New York, N. Y...*p. 604*
STURTEVANT MILL CO., Harrison Sq., Boston, 22, Mass...*pp. 600, 601*
Vulcan Iron Works, Wilkes-Barre, Pa.
*WORTHINGTON PUMP & MACHINERY CORP'N, 135 Broadway, New York, N. Y. ..*pp. 44, 45, 46, 47*

CEMENT TESTING MACHINES
OLSEN, TINIUS TESTING MACHINE CO., 500 N. 12th St., Philadelphia, Pa...*pp. 265, 266, 267*
RIEHLE BROS. TESTING MACHINE CO 1424 N. 9th St., Philadelphia, Pa...*p. 268*

CENTERING MACHINES
Binghamton Machine Works, 38 Chenango St., Binghamton, N. Y.
Hanson-Whitney Machine Co., 169 Bartholomew Ave., Hartford, Conn.
Hendey Machine Co., Torrington, Conn.
NILES-BEMENT-POND CO., 111 Broadway, New York, N. Y...*p. 470*
PRATT & WHITNEY CO., 111 Broadway, New York, N. Y...*p. 471*
Whiton, D. E. Machine Co., New London, Conn.

CENTERS

—Index
Willard Middletown Machine Co., Cincinnati, Ohio

—Lathe
Eastern Tube & Tool Co. (Inc.), 593 Johnson Ave., Brooklyn, N. Y.
Ready Tool Co., Bridgeport, Conn.

CENTRIFUGAL PUMPS, SEPARATORS, ETC. (See Pumps, Separators, etc., Centrifugal)

CENTRIFUGALS
—For Sugar, Chemicals, etc.
AMERICAN TOOL & MACHINE CO., ("Weston"), Boston 9, Mass...*p. 614*
De Laval Separator Co., 165 Broadway, New York, N. Y.
Fletcher Works, Glenwood Ave. & 2nd St., Philadelphia, Pa.
Hepworth, S. S. Co., 2 Rector St., New York, N. Y.
Hiller, Joseph L., 21 South Twelfth St., Philadelphia, Pa.
Sharples Specialty Co., 23rd & Westmoreland Sts., Philadelphia, Pa.
*TOLHURST MACHINE WORKS, Troy, N. Y...*p. 616*

—Metal Drying
AMERICAN TOOL & MACHINE CO., Boston 9, Mass...*p. 614*
*TOLHURST MACHINE WORKS, Troy, N. Y...*p. 616*

—Oil and Waste
AMERICAN TOOL & MACHINE CO., Boston 9, Mass...*p. 614*
De Laval Separator Co., 165 Broadway, New York, N. Y.
*DE LAVAL STEAM TURBINE CO., Trenton, N. J...*p. 22*
D'Olier Centrifugal Pump & Machine Co., 400 Morris Bldg., Philadelphia, Pa.

CEREAL MILL MACHINERY
Sprout, Waldron & Co., Muncy, Pa.
OIL & WASTE SAVING MACHINE CO., 1509 Real Estate Trust Bldg., Philadelphia, Pa...*p. 615*
*TOLHURST MACHINE WORKS, Troy, N. Y...*p. 616*
Union Iron Works, 600 E. William St., Decatur, Ill.

—Corn
Beall Improvement Co. (Inc.), Decatur, Ill.

CHAIN BELTS AND LINKS
Alvey-Ferguson Co., 75 North Ave., Oakley, Cincinnati, Ohio
Baldwin Chain & Mfg. Co., Worcester, Mass.
*CALDWELL, H. W. & SON CO., 17th St. & Western Ave., Chicago, Ill...*p. 370*
Chain Belt Co., Milwaukee, Wis.
*DIAMOND CHAIN & MFG. CO., Indianapolis, Ind...*p. 320*
Hobbs, Clinton E. Co., 12 Pearl St., Boston, Mass.
JEFFREY MFG. CO., 904 N. 4th St., Columbus, Ohio..*pp. 376, 377*
Mey Chain Belt Co., (Inc.), 82 Washington St., Buffalo, N. Y.
*MORSE CHAIN CO., Ithaca, N. Y...*p. 321*
NEWHALL CHAIN FORGE & IRON CO., 90 West St., New York, N. Y...*p. 410*
Stowell Co., South Milwaukee, Wis.
*UNION ENGINEERING CO., Cleveland, Ohio..*p. 645*
WELLER MFG. CO., 1820-56 N. Kostner Ave., Chicago, Ill...*p. 381*
*WHITNEY MFG. CO., ("Whitney"), Hartford, Conn...*p. 495*

CHAIN DRAW BENCHES
Richard Mfg. Co., Bloomsburg, Pa.

CHAIN GRATE STOKERS
(See Stokers, Chain Grate)

CHAIN HOISTS, SLINGS, ETC.
(See Hoists, Slings, etc., Chain)

CHAIN MACHINES
Atlas Machine Co., 140 Manhan St., Waterbury, Conn.
Baird Machine Co., Bridgeport, Conn.
Vaughn Machinery Co., Cuyahoga Falls, Ohio

CHAIN TESTING MACHINES
OLSEN, TINIUS TESTING MACHINE CO., 500 N. 12th St., Philadelphia, Pa...*pp. 265, 266, 267*
RIEHLE BROS. TESTING MACHINE CO., 1424 N. 9th St., Philadelphia, Pa...*p. 268*

CHAINS
—Block or Sprocket Wheel
*DIAMOND CHAIN & MFG. CO., Indianapolis, Ind...*p. 320*
NEWHALL CHAIN FORGE & IRON CO., 90 West St., New York, N. Y...*p. 410*
NEW JERSEY FOUNDRY & MACHINE CO., 90 West St., New York, N. Y...*p. 396*
Speidel, J. G., Reading, Pa.
WELLER MFG. CO., 1820-1856 N. Kostner Ave., Chicago, Ill...*p. 381*

—Cable
American Chain Co., 38 W. 39th St., New York, N. Y.
*CALDWELL, H. W. & SON., 17th St. & Western Ave., Chicago, Ill...*p. 370*
Hobbs, Clinton E. Co., 12 Pearl St., Boston, Mass.
NEW JERSEY FOUNDRY & MACHINE CO., 90 West St., New York, N. Y...*p. 396*
Woodhouse Chain Works, Trenton, N. J.
NEWHALL CHAIN FORGE & IRON CO., 90 West St., New York, N. Y...*p. 410*

—Coil
American Chain Co, 38 West 39th St., New York, N. Y.
*CALDWELL, H. W. & SON CO., 17th St. & Western Ave., Chicago, Ill...*p. 370*
JEFFREY MFG. CO., 904 N. 4th St., Columbus, Ohio..*pp. 376, 377*
NEWHALL CHAIN FORGE & IRON CO., 90 West St., New York, N. Y...*p. 410*
NEW JERSEY FOUNDRY & MACHINE CO., 90 West St., New York, N. Y. *p. 396*
Speidel, J. G., Reading, Pa.

—Crane
American Chain Co., 38 West 39th St., New York, N. Y.

Ch

Digitized by Google

*AMERICAN FORGE & MACHINE CO., Canton, Ohio..*pp. 430, 431*
Hobbs, Clinton E. Co., 12 Pearl St., Boston, Mass.
MORRIS, HERBERT, (Inc.), 1-15 Lawrence Place, Buffalo, N. Y...*p. 402*
NEWHALL CHAIN FORGE & IRON CO., 90 West St., New York, N. Y...*p. 410*
NEW JERSEY FOUNDRY & MACHINE CO., 90 West St., New York, N. Y...*p. 396*
Speidel, J. G., Reading, Pa.
Woodhouse Chain Works, Trenton, N. J.

—Dredge
NEWALL CHAIN FORGE & IRON CO., 90 West St., New York, N. Y...*p. 410*
NEW JERSEY FOUNDRY & MACHINE CO., 90 West St., N. Y...*p. 396*
Speidel, J. G., Reading, Pa.
Weimer Chain & Iron Co., Lebanon, Pa.

—Power Transmission
Abell Howe Co., (''American''), 1406 So. Michigan Ave., Chicago, Ill.
American High Speed Chain Co., 401 South Illinois, Indianapolis, Ind.
Baldwin Chain & Mfg. Co., Worcester, Mass.
*CALDWELL, H. W. & SON CO., 17th St. & Western Ave., Chicago, Ill. *p. 370*
*DIAMOND CHAIN & MFG. CO., Indianapolis, Ind. *p. 320*
Duckworth Chain & Mfg. Co., Springfield, Mass.
JEFFREY MFG. CO., 904 N. 4th St., Columbus, Ohio..*pp. 376, 377*
*JONES, W. A. FOUNDRY & MACHINE CO., 4415 West Roosevelt Road, Chicago, Ill... *pp. 312, 313, 314, 315*
Link-Belt Co., 39th St. & Stewart Ave., Chicago, Ill.
*MEDART PATENT PULLY CO., St. Louis, Mo.
*MORSE CHAIN CO., Ithaca, N. Y...*p. 321*
Union Chain & Mfg. Co., Seville, Ohio
WELLER MFG. CO., 1820-1856 N. Kostner Ave., Chicago, Ill...*pp. 381, 422*
*WHITNEY MFG. CO., (''Whitney''), Hartford, Conn...*p. 495*

—Pressed Steel
STANDARD SAND & MACHINE CO., 5151 St. Clair Ave., Cleveland, Ohio..*p. 635*
Union Chain & Mfg. Co., Seville, Ohio

—Quarry
NEWHALL CHAIN FORGE & IRON CO., 90 West St., New York, N. Y...*p. 410*
NEW JERSEY FOUNDRY & MACHINE CO., 90 West St., New York, N. Y...*p. 396*

—Steam Shovel
NEWHALL CHAIN FORGE & IRON CO., 90 West St., New York, N. Y...*p. 410*
NEW JERSEY FOUNDRY & MACHINE CO., 90 West St., New York, N. Y...*p. 396*
Weimer Chain & Iron Co., Lebanon, Pa.
Woodhouse Chain Works, Trenton, N. J.

—Welded
Cross Engineering Co., Carbondale, Pa.
NEWHALL CHAIN FORGE & IRON CO., 90 West St., New York, N. Y...*p. 410*
Round, D. & Sons, Cleveland, Ohio
Tamaqua Mfg. Co., Tamaqua, Pa.

—Wire, Weldless
Bridgeport Chain Co., 964 Crescent Ave., Bridgeport, Conn.

CHANNELING MACHINES (Mine & Quarry)
*INGERSOLL-RAND CO., 11 Broadway, New York, N. Y...*pp. 546, 547*
SULLIVAN MACHINERY CO., (''Stone''), 120 S. Michigan Ave., Chicago, Ill...*p. 549*

CHARGING MACHINES (Furnace)
Brosius, Egdar E., 1212 Benedum Trees Bldg., Pittsburgh, Pa.
Pittsburgh Crane & Equipment Co., 19th & P. R. R., Sharpsburg, Pa.

CHEMICAL APPARATUS
Bario-Metal Corp'n, 167 W. 18th St., New York, N. Y.
Buffalo Foundry & Machine Co., 41 Winchester Ave., Buffalo, N. Y.
*FULLER-LEHIGH CO., Fullerton, Pa...*p. 128*
GRIEBEL INSTRUMENT CO., Carbondale, Pa...*p. 300*
Hercules Engineering Corp'n, 501 5th Ave., New York, N. Y.
Pfaudler Co., 217 Cutler Bldg., Rochester, N. Y.
Schaeffer Machine Works, 35th and Crays Ferry Road, Philadelphia, Pa.
Standard Scientific Co., Cor. W. 4th & Barrow Sts., New York, N. Y.
SWENSON EVAPORATOR CO., 945 Monadnock Bldg., Chicago, Ill...*p. 611*
Townsend Furnace & Machine Shop Co., Broadway & Rensselaer St., Albany, N. Y.

CHEMICAL WORKS EQUIPMENT
Struthers-Wells Co., Warren, Pa.

CHIMNEYS
—Brick (Radial)
AMERICAN CHIMNEY CORP'N, 147 Fourth Ave., New York, N. Y...*p. 95*
Custodis, Alphons Chimney Construction Co., 95 Nassau St., New York, N. Y.
Heine Chimney Co.,. 123 W. Madison St., Chicago, Ill.
Heinicke, H. R. (Inc.), 147 Fourth Ave., New York, N. Y.
Kellogg, M. W. Co., 90 West St., New York, N. Y.
Rust Engineering Co., 504 District Nat'l Bank Bldg., Washington, D. C.
Wiederholdt Construction Co., Commonwealth Trust Bldg., St. Louis, Mo.

—Concrete
AMERICAN CHIMNEY CORP'N, 147 Fourth Ave., New York, N. Y...*p. 95*
General Concrete Construction Co., 431 S. Dearborn St.. Chicago, Ill.
Heine Chimney Co., 123 W. Madison St., Chicago, Ill.
Rust Engineering Co., 504 District Nat'l Bank Bldg., Washington, D. C.
Weber Chimney Co. (''Weber''), 1455-56 McCormick Bldg., Chicago, Ill.
Wiederholdt Construction Co., 620 Bank of Commerce Bldg., St. Louis, Mo.

—Steel
(See Stacks, Steel)

CHIP WRINGERS
*TOLHURST MACHINE WORKS, Troy, N. Y...*p. 616*

CHIPPERS (Wood)
Carthage Machine Co., Carthage, N. Y.
VALLEY IRON WORKS CO., Appleton, Wis. ..*p. 647*

CHISEL BLANKS
CHICAGO PNEUMATIC TOOL CO., 6 E. 44th St., New York, N. Y...*p. 548*
MARCHANT, GEO. F. CO., 1420-28 S. Rockwell St., Chicago, Ill...*p. 505*

CHOCOLATE MAKING MACHINERY
National Equipment Co., Springfield, Mass.

CHUCKING MACHINES
—Automatic Multiple-Spindle
Bullard Machine Tool Co., (''Multi-Au-Matic''), Bridgeport, Conn.
McDonough Mfg. Co. (''Daniels''), Eau Claire, Wis.
NEW BRITAIN MACHINE CO., New Britain, Conn...*p. 463*

Digitized by Google

—Heavy Duty
NILES-BEMENT-POND CO., 111 Broadway, New York, N. Y...*p. 470*

—Turret
Bullard Machine Tool Co., Bridgeport, Conn.
INTERNATIONAL MACHINE TOOL CO., ("Libby"), 1124 W. 21st St. & Belt Railway, Indianapolis, Ind...*pp. 448, 449*
*JONES & LAMSON MACHINE CO., ("Hartness"), Springfield, Vt...*pp. 450, 451, 452, 453, 454*
NILES-BEMENT-POND CO., 111 Broadway, New York, N. Y...*p. 470*
STEINLE TURRET MACHINE CO., Madison, Wis...*p. 447*
WOOD TURRET MACHINE CO., ("Tilted Turret"), Brazil, Ind...*pp. 458, 459*

CHUCKS

—Air Operated
Crescent Sales & Engrg. Co., Detroit, Mich.
Frontier Chuck and Tool Co., 36 Letchworth St., Buffalo, N. Y.
Hannifan Mfg. Co., 621-31 S. Kilman Ave., Chicago, Ill.
Manufacturers Equipment Co., ("M. E. C."), Waller Ave. & Fillmore St., Chicago, Ill.
Neidow-Payson Co., 9 S. Clinton St., Chicago, Ill.
Frank G. Payson Co., ("Logan"), 9 So. Clinton St., Chicago, Ill.

—Bevel Gear
Garrison Machine Works ("O, G."), Dayton, Ohio

—Collet
Quick Action Chuck Corp'n, Grand Rapids, Mich.

—Drill
Almond, T. R. Mfg. Co., Ashburnham, Mass.
Cushman Chuck Co., Hartford, Conn.
Eastern Tube & Tool Co. (Inc.), 594 Johnson Ave., Brooklyn, N. Y.
Foster Machine Co., ("Barker"), W. Beardsley Ave., Elkhart, Ind.
Goodell-Pratt Co., Greenfield, Mass.
Horton, E. & Son Co., Windsor Locks, Conn.
Jacobs Mfg. Co., 984 Park St., Hartford, Conn.
McCrosky Tool Corpn., ("McCrosky Wizard"), Meadville, Pa.
Marvin & Casler Co., Canastota, N. Y.
Narragansett Machine Co., Providence, R. I.
Nielsen-Barton Chuck Co., ("Eclipse"), 106 S. Jefferson St., Chicago, Ill.
Pratt Chuck Co., ("Empire National"), Frankfort, N. Y.
Quick Action Chuck Corp'n, Grand Rapids, Mich.
*S K F INDUSTRIES, (Inc.), 165 Broadway, New York, N. Y...*pp. 348, 349, 350*
Scully-Jones Co., 2012 West 13th St., Chicago, Ill.
Skinner Chuck Co., New Britain, Conn.
Trump Bros. Machine Co., ("Trump"), Beech & Anchorage Sts., Wilmington, Del.
Union Mfg. Co., New Britain, Conn.
Wahlstrom Tool Co., 5500 2nd Ave., Brooklyn, N. Y.
Westcott Chuck Co., East Walnut Co., Oneida, N. Y.
*WHITNEY MFG CO., ("Preste"), Hartford, Conn...*p. 495*

—Gear
Garrison Machine Works ("Johnson"), Dayton, Ohio

—Lathe
Almond, T. R. Mfg. Co., Ashburnham, Mass.
Cushman Chuck Co., Hartford, Conn.
AMERICAN TOOL & MACHINE CO., Boston, Mass...*p. 614*
Frontier Chuck and Tool Co., 36 Letchworth St., Buffalo, N. Y.
HOGGSON & PETTIS MFG. CO., New Haven, Conn...*pp. 512, 513, 514*
Horton, E. & Son Co., Windsor Locks, Conn.
Karge Baker Corp'n, ("Karge"), Phoenix, N. Y.
LEAVITT MACHINE CO., Orange, Mass...*pp. 198, 199*
Lima Drill Press Co., 207 Holland Block, Lima, Ohio
Quick Change Chuck Mfg. Co., 818 E. Monument Ave., Dayton, Ohio
Skinner Chuck Co., New Britain, Conn.
Thomas Elevator Co., 22 S. Hoyne Ave., Chicago, Ill.
Union Mfg. Co., New Britain, Conn.
Westcott Chuck Co., East Walnut St., Oneida, N. Y.

—Magnetic
*GENERAL ELECTRIC CO., Schenectady, N. Y...*pp. 18, 19, 20, 21*
*HEALD MACHINE CO., Worcester, Mass...*pp. 486, 487*
Persons Arter Machine Co., 72 Commercial St., Worcester, Mass.
Taft-Pierce Mfg. Co., Woonsocket, R. I.
Walker, O. S. Co., Worcester, Mass.

—Ring Wheel
Badger Tool Co., Beloit, Wis.

—Tapping
Errington Mechanical Laboratory, B'way & John St., New York, N. Y.
Peter Brothers' Mfg. Co., Algonquin, Ill.
Procunier, William L., 14 So. Jefferson Ave., Chicago, Ill.
St. Louis Machine Tool Co., 932 Loughborough Ave., St. Louis, Mo.
Scully Jones Co. ("Wear Ever") 2012 West 13th St., Chicago, Ill.
*WHITNEY MFG. CO. ("Hollm"), Hartford, Conn...*p. 495*
Whiton, D. E., Machine Co., New London, Conn.

CHUTES

Acme Waste Chute, Box 65, Ridgewood, N. J.
FAIRBANKS-MORSE & CO., 900 S. Wabash Ave., Chicago, Ill...*p. 41*
HONHORST, JOS. CO., 1016-20 W. 6th St., Cincinnati, Ohio...*p. 654*
JEFFREY MFG. CO., 904 N. 4th St., Columbus, Ohio...*pp. 376, 377*
NEW YORK CENTRAL IRON WORKS CO., (INC.), North Middleburg Road, Hagerstown, Md...*p. 659*
STURTEVANT MILL CO., Harrison Sq., Boston, 22, Mass...*pp. 600, 601*

—Gravity (Spiral)
Alvey-Ferguson Co., 75 North Ave., Oakley, Cincinnati, O.
DODGE SALES & ENGINEERING CO., Mishawaka, Ind...*pp. 42, 43, 326, 327, 328, 329*
Haslett Spiral Chute Co., 510-512 N. 61st St., Philadelphia, Pa.
LAMSON CO., 100 Boyleston St., Boston, Mass...*pp. 378, 379*
Mathews Gravity Carrier Co., Ellwood City, Pa.
Olsen, Samuel & Co., 2418-22 Bloomingdale Ave., Chicago, Ill.
STANDARD CONVEYOR CO., North St. Paul, Minn...*pp. 330, 421*
STURTEVANT MILL CO., Harrison Sq., Boston, 22 Mass...*pp. 600, 601*
WELLER MFG. CO., 1820-1856 N. Kostner Ave., Chicago, Ill...*p. 381*

—Laundry (Glass Lined Steel)
Pfaudler Co., 217 Cutler Bldg., Rochester, N. Y.

Ch

Digitized by Google

—Measuring
HUNT, C. W. CO., (INC.). West New Brighton, Staten Island, N. Y...*pp. 374, 375*

CIGAR MAKING MACHINERY
Miller, DuBrul & Peters Mfg. Co., 507-521 E. Pearl St., Cincinnati, Ohio.

CIGARETTE MAKING MACHINERY
Miller, Dubrul & Peters Mfg. Co., 507-521 E. Pearl St., Cincinnati, Ohio.

CINDER MILLS
(See Mills, Cinder)

CIRCUIT BREAKERS
Automatic Reclosing Circuit Breaker Co., 6th & Wesley Aves., Columbus, O.
Condit Electrical Mfg. Co., 838 Summer St., South Boston, Mass.
Equitherm Control Corp'n, 13 Tillery St., Brooklyn, N. Y.
*GENERAL ELECTRIC CO., Schenectady, N. Y...*pp. 18, 19, 20, 21*
Sundh Electric Co., 209 Parkhurst St., Newark, N. J.
*WESTINGHOUSE ELECTRIC & MFG. CO., East Pittsburgh, Pa...*pp. 160, 161*

CIRCULATORS, FEED WATER
Borromite Co. of America, 1509 Standard Trust Bldg., Chicago, Ill.
Eckliff Circulator Co., ("Eckliff"), Campau Bldg., Detroit, Mich.
Ross Schofield Co., 17 Battery Place, New York.

CLAMPING DEVICES (Air-Operated)
Hannifan Mfg. Co., 621-31 S. Kilman Ave., Chicago, Ill.

CLAMPS

Ci

—Belt
*CALDWELL, H. W. & SON CO., 17th St. & Western., Chicago, Ill...*p. 370*
DODGE SALES & ENGINEERING CO., Mishawaka, Ind...*pp. 42, 43, 326, 327, 328, 329*
*WOOD'S T. B. SONS CO., Chambersburg, Pa...*pp. 334, 335*

—"C"
WILLIAMS, J. H. & CO., 70 Richard St., Brooklyn, N. Y...*p. 517*

—Cable
Cameron Appliance Co., Everett, Mass.
DIAMOND EXPANSION BOLT CO., ("Long-Saut"), 90 West St. cor. Cedar, New York, N. Y...*p. 526*
*ROEBLING'S, JOHN A. SONS CO., Trenton, N. J...*p. 409*
*WESTINGHOUSE ELECTRIC & MFG. CO., East Pittsburgh, Pa...*pp. 160, 161*

—Guy
NEWHALL CHAIN FORGE & IRON CO., 90 West St., New York, N. Y...*p. 410*
*ROEBLING'S JOHN A. SONS CO., Trenton, N. J...*p. 409*

—Machine Table
STANDARD SHOP EQUIPMENT CO., 23rd & Hunting Park Ave., Philadelphia, Pa...*p. 515*

—Machinists'
WILLIAMS, J. H. & CO., 70 Richards St Brooklyn, N. Y...*p. 517*

—Pipe
*CRANE CO., 836 S. Michigan Ave., Chicago, Ill...*pp. 170, 171, 172, 173*
DIAMOND EXPANSION BOLT CO., ("Diamond"), 90 West St. cor. Cedar, New York, N. Y...*p. 526*
Power Plant Specialties, 219 Ruffner St., Lockland, O.
Skinner, M. B. Co., ("Emergency"), 562 Washington Boul., Chicago, Ill.
*YARNALL-WARING CO., ("Yarway"), 7603-20 Queen St., Chestnut Hill, Philadelphia, Pa...*p. 196*

—Pipe Joint
Skinner, M. B. Co., ("Skinner"), 562 Washington Boulv., Chicago, Ill.

—Saw Filing
Quality Saw Co., 91 Hale St., Haverhill, Mass.

—Strap
WILLIAM, J. H. & CO., 70 Richards St., Brooklyn, N. Y...*p. 517*

CLASSIFIERS
*ALLIS-CHALMERS MFG. CO., Milwaukee, Wis...*pp. 28, 29*
Dorr Co., Inc., 101 Park Ave., New York, N. Y.
Wizard Separator Co., Vickers Bldg., Baltimore, Md.

CLAY, FIRE
Ashland Fire Brick Co., Ashland, Ky.
Betson Plastic Fire Brick Co. (Inc.), Box 368-A, Rome, N. Y.
*CRESCENT REFRACTORIES CO., Curwensville, Clearfield County, Pa...*p. 136*
Dover Fire Brick Co., 509 Cuyahoga Bldg., Cleveland, Ohio.
Gardner, James, Jr., Co., Ebensburg, Pa.
Maurer, Henry & Son, 420 E. 33rd St., New York, N. Y.
Pyro Clay Products Co., Oak Hill, Ohio.
Southern Refractories Co., Fort Payne, Ala.
Union Mining Co., ("Mount Savage"), 1113 Fidelity Bldg., Baltimore, Md.
Walsh Fire Clay Products Co., 4070 N. Main St., St. Louis, Mo.

CLAY WASHING MACHINERY
Patterson Foundry & Machine Co., East Liverpool, Ohio

CLAY WORK MACHINERY
BONNOT CO., Canton, Ohio...*p. 598*
CHAMBERS BROS. CO., Philadelphia, Pa...*p. 599*
Crossley Machine Co., State & Monmouth Sts., Trenton, N. J.
Eastern Machinery Co., New Haven, Conn.
*FULLER-LEHIGH CO., Fullerton, Pa...*p. 128*
Hadfield-Penfield Steel Co., Bucyrus, Ohio
LANCASTER IRON WORKS (INC.), Lancaster, Pa...*pp. 656, 657*
Marion Machine Foundry & Supply Co., Marion, Ind.
Steele, J. C. & Sons, Statesville, N. C.
STURTEVANT MILL CO., Harrison Sq., Boston 22, Mass...*pp. 600, 601*
WILLIAMS PATENT CRUSHER & PULVERIZER CO., St. Louis, Mo...*pp. 602, 603*

CLEVISES
Merrill Bros., Maspeth, N. Y.
NEWHALL CHAIN, FORGE & IRON CO., 90 West St., New York, N. Y...*p. 410*

CLOTH COATING MACHINERY
Currier, Cyrus & Sons, Newark, N. J.

CLOTH TESTING MACHINES
OLSEN, TINIUS TESTING MACHINE CO., 500 N. 12th St., Philadelphia, Pa...*pp. 265, 266, 267*
PERKINS, B. F. & SONS, (INC.), ("Mullen" "Perkins"), Holyoke, Mass...*p. 558*
RIEHLE BROS. TESTING MACHINE CO., 1424 N. 9th St., Philadelphia, Pa...*p. 268*
*WESTINGHOUSE ELECTRIC & MFG. CO., East Pittsburgh, Pa...*pp. 160, 161*

CLOTH
—Blue Print, Tracing
(See Blue Print Cloth, Tracing Cloth)

—Emery
Manning Abrasive Co., (Inc.), Troy, N. Y.

Digitized by Google

—Filter
Shriver, T. & Co., 844 Hamilton St., Harrison, N. J.

—Rubber
Consolidated Rubber Co., P. O. Box 86, Trenton, N. J.
GOODRICH, B. F. RUBBER CO., Akron, Ohio...*pp. 258, 259*

—Wire
Buffalo Wire Works Co., 540 Terrace, Buffalo, N. Y.
Howard & Morse, 45 Fulton St., New York, N. Y.
Michigan Wire Cloth Co., 536 Howard St., Detroit, Mich.
Morss & Whyte Co., Sidney & Pilgrim St., Cambridge, Mass.
Newark Wire Cloth Co., 224 Verona Ave., Newark, N. J.
New Jersey Wire Cloth Co., Trenton, N. J.
Pennsylvania Wire Works, 520 N. Third St., Philadelphia, Pa.
*ROEBLING'S, JOHN A. SONS CO., Trenton, N. J...*p. 409*
Rogers Wire Works, (Inc.), 291 Broadway, New York, N. Y.

CLUTCH SHIFTERS
*WOOD'S, T. B. SONS CO., Chambersburg, Pa...*pp. 334, 335*

CLUTCHES

—Automobile
Brown-Lipe Gear Co., 1117 W. Fayette St., Syracuse, N. Y.
Detroit Gears & Machine Co., 670 Woodridge St., Detroit, Mich.
National Clutch Co., 1859 Fulton St., New York, N. Y.
Twin Disc Clutch Co., Racine, Wis.
Warner Gear Co., Muncie, Indiana.

—Friction
*ALLIS-CHALMERS MFG. CO., Milwaukee, Wis...*pp. 28, 29*
AMERICAN TOOL & MACHINE CO., ("Hill, Hub, Worrall"), Boston 9, Mass...*p. 614*
*BROWN, A. & F. CO., 79 Barclay St., New York, N. Y...*p. 303*
Brown Clutch Co., Sandusky, O.
Brown Engineering Co., Reading, Pa.
*CALDWELL, H. W. & SON CO., 17th St. & Western Ave., Chicago, Ill...*p. 370*
*CALDWELL, W. E. 340 E. Brandeis St., Louisville, Ky...*p. 323*
CHAMBERS BROS. CO., Philadelphia, Pa...*p. 599*
CHICAGO PULLEY & SHAFTING CO., 30 So. Clinton St., Chicago, Ill...*pp. 324, 325*
CONNELLSVILLE MFG. & MINE SUPPLY CO., Connellsville, Pa...*p. 384*
Conway Clutch Co., 1950 West Sixth St., Cincinnati, Ohio.
DODGE SALES & ENGINEERING CO., Mishawaka, Ind...*pp. 42, 43, 326, 327, 328, 329*
Eastern Machinery Co., New Haven, Conn.
Edgemont Machine Co., 2200 Home Ave., Dayton, Ohio.
FAIRBANKS-MORSE & CO., 900 S. Wabash Ave., Chicago, Ill...*p. 41*
*FALLS CLUTCH & MACHINERY CO. Cuyahoga Falls, Ohio...*p. 330*
Fletcher Works, Glenwood Ave. & 2nd St., Philadelphia, Pa.
Fremont Clutch Co., Fremont, Ohio.
*GIFFORD-WOOD CO., Hudson, N. Y...*p. 372*
Hanson Clutch & Machinery Co., Tiffin, Ohio.
Hess-Snyder Co., Massillon, Ohio.
*HILL CLUTCH CO., Cleveland, Ohio...*p. 331*
Hilliard Clutch & Machinery Co., Elmira, N. Y.
JEFFREY MFG. CO., 904 N. 4th St., Columbus, Ohio...*pp. 376, 377*
*JOHNSON, CARLYLE MACHINE CO., Manchester, Conn...*p. 332*
*JONES, W. A. FOUNDRY & MACHINE CO., ("Lemley"), 4415 West Roosevelt Road, Chicago, Ill...*pp. 312, 313, 314, 315*
Kinney Mfg. Co., Jamaica Plain, Boston, Mass.
McMahon & Co., Worcester, Mass.
Mason, Volney W. & Co., (Inc.), 2 Lafayette St., Providence, R. I.
*MEDART PATENT PULLEY CO., St. Louis, Mo...*p. 333*
Milwaukee Shaper Co., 1029 Cold Spring Ave., Milwaukee, Wis.
Moore & White Co., Philadelphia, Pa.
Muncie Oil Engine Co., ("M & G"), 700 S. Mulberry St., Muncie, Ind.
National Clutch Co., 1859 Fulton St., New York, N. Y.
"Never-Slip" Clutch Co., Noblesville, Ind.
O. K. Clutch & Machinery Co., Columbia, Pa.
Production Machine Co., Greenfield, Mass
Reliance Gauge Column Co., ("Cleveland") 5902 Carnegie Ave., Cleveland, Ohio.
Schultz, A. L. & Son, 1675 Elston St., Chicago, Ill.
WELLER MFG. CO., 1820-1856 N. Kostner Ave., Chicago, Ill...*p. 381*
Westlund, Carl G. Co., 498 Millbury St., Worcester, Mass.
*WOOD'S, T. B., SONS CO. ("Universal Giant") Chambersburg, Pa...*pp, 334, 335*
Yocom, Jas. & Son, 145 N. 2nd St., Philadelphia, Pa.

—Magnetic
Cutler-Hammer Mfg. Co., 12th St. & Paul Ave., Milwaukee, Wis.

—Reverse
Muncie Oil Engine Co., 700 S. Mulberry St., Muncie, Ind.

—Tractor
Twin Disc Clutch Co., Racine, Wis.

COAL AGITATORS
*ELLIS, W. E. CO., Haverhill, Mass...*p. 132*

COAL AND ASH HANDLING MACHINERY
Abell-Howe Co., 1406 So. Michigan Ave., Chicago, Ill.
Alvey-Ferguson Co., 75 North Ave., Oakley, Cincinnati, Ohio.
American Conveyor Co., 6611 Drexel Ave., Chicago, Ill.
American Machinery Co., 103 W. Water St., Milwaukee, Wis.
Andresen-Evans Co., 646 Railway Exchange Bldg., Chicago, Ill.
BARTLETT, C. O. & SNOW CO., Cleveland, Ohio...*p. 367*
*BEAUMONT, R. H. CO., 340 Arch St., Philadelphia, Pa...*pp, 368, 369*
Bergen Point Iron Works, Foot W. 5th St., Bayonne, N. J.
*BROWN HOISTING MACHINERY CO., Cleveland, Ohio...*p. 390*
Brown Portable Conveying Machinery Co., Chicago, Ill.
Burr Co., Champaign, Ill.
*CALDWELL, H. W. & SON CO., 17th St. & Western Ave., Chicago, Ill...*p. 370*
Chicago Automatic Conveyor Co., 11 So. La Salle St., Chicago, Ill.
Conveyors Corporation of America, 326 W. Madison St., Chicago, Ill.
Cross Engineering Co., Carbondale, Pa.
FAIRBANKS-MORSE & CO., 900 S. Wabash *372*
Fairmont Mining Machinery Co., Fairmont, W. Va.
*GIFFORD-WOOD CO., Hudson, N. Y...*p. 372*

Co

Digitized by Google

Girtanner Engineering Corp., 1400 Broadway, New York, N. Y.
Godfrey Conveyor Co., Elkhart, Ind.
Guarantee Construction Co., 40 Cedar St. New York, N. Y.
Haiss, George Mfg. Co., (Inc.), 141st St. & Rider Ave., New York, N. Y.
Hayward Co., 50 Church St., New York, N. Y.
*HENDRICK MFG. CO., Carbondale, Pa... *p. 653*
HUNT, C. W. CO., (INC.), West New Brighton, Staten Island, N. Y...*pp. 374, 375*
INDUSTRIAL WORKS, Bay City, Mich... *pp. 392, 393*
JEFFREY MFG. CO., 904 N. 4th St., Columbus, Ohio...*pp. 376, 377*
*LIDGERWOOD MFG. CO., 96 Liberty St., New York, N. Y...*p. 388*
Louden Machinery Co., Fairfield, Iowa.
McKee, Arthur G. & Co., Rockefeller Bldg., Cleveland, Ohio.
Manierre Engineering & Machinery Co., 622 Colby Abbot Building, Milwaukee, Wis.
Mead-Morrison Mfg. Co., Prescott & Orleans Sts., East Boston, Mass.
MORRIS, HERBERT, (INC.), 1-15 Lawrence Place, Buffalo, N. Y...*p. 402*
Orton & Steinbrenner Co., Chicago, Ill.
Portable Machinery Co., Passaic, N. J.
Robertson, Wm. & Co., ("Robertson"), 20 W. Jackson Blvd., Chicago, Ill.
ROBBINS CONVEYING BELT CO., Park Row Bldg., New York, N. Y...*p. 373*
Sauerman Bros., 314 S. Dearborn St., Chicago, Ill.
*SHEPARD ELECTRIC CRANE & HOIST CO., Montour Falls, N. Y...*pp. 400, 401*
Specialty Engineering Co., Allegheny & Trenton Aves., Philadelphia, Pa.
Stearns Conveyor Co., Cleveland, Ohio.
Stephens-Adamson Mfg. Co., Aurora, Ill.
Underwood Machinery Co., 110-120 Mt. Vernon St., South Boston, Mass.
UNION ENGINEERING CO., Cleveland, Ohio. ..*p. 645*
Universal Conveyor Co., 628 J.M.S. Bldg., So. Bend, Ind.
Vacuum Arh & Soot Conveyor Co., Wilson & Hyatt Aves., Newark, N. J.
WELLER MFG. CO., 1820-1856 N. Kostner Ave., Chicago, Ill...*p. 381*

COAL BREAKERS AND CLEANERS
Pennsylvania Crusher Co., ("Bradford") 1324 Stephen Girard Bldg., Philadelphia, Pa.

COAL CUTTING MACHINES
JEFFREY MFG. CO., 904 N. 4th St., Columbus, Ohio...*pp. 376, 377*
Morgan-Gardner Electric Co., 27th St. & Shields Ave., Chicago, Ill.

COAL MINING MACHINERY
Burr Co., Champaign, Ill.
*CASEY-HEDGES CO., Chattanooga, Tenn... *pp. 60, 61*
Goodman Mfg. Co., Halsted St. & 49th St., Chicago, Ill.
*INGERSOLL-RAND CO., 11 Broadway, New York, N. Y...*pp. 546, 547*
JEFFREY MFG. CO., 904 N. 4th St., Columbus, Ohio...*pp. 376, 377*
Mancha Storage Battery Locomotive Co., 1909 S. Kingshighway, St. Louis, Mo.
Milholland, J. & J. B. Co., 718 Fifth Ave., Pittsburgh, Pa.
Pneumelectric Corporation, 219 Wyoming St., Syracuse, N. Y.
SULLIVAN MACHINERY CO., ("Ironclad"), 120 S. Michigan Ave., Chicago Ill...*p. 549*
United Iron Works, (Inc.), 301 Ridge Arcade Bldg., Kansas City, Missouri.

COAL PREPARING EQUIPMENT
Associated Engineering Co., Somerset, Ky.
BARTLETT, C. O. & SNOW CO., Cleveland, Ohio. *p. 367*
*FULLER-LEHIGH CO., Fullerton, Pa...*p. 128*
JEFFREY MFG. CO., 904 N. 4th St., Columbus, Ohio...*pp. 376, 377*
Pittsburgh Coal Washer Co., Fulton Bldg., Pittsburgh, Pa.
*QUIGLEY FURNACE SPECIALTIES CO. (INC.), 26 Cortlandt St, New York, N. Y. *pp. 129, 138, 139*
Scottdale Machine & Mfg. Co., Scottdale, Pa.
Tamaqua Mfg. Co., Tamaqua, Pa.

COAL PUSHERS (Mechanical)
Locomotive Stoker Co., 30 General Robinson St., West, Northside, Pittsburgh, Pa.

COAL STORAGE SYSTEMS
*BEAUMONT, R. H. CO., 340 Arch St., Philadelphia, Pa...*pp. 368, 369*
JEFFREY MFG. CO., 904 N. 4th St., Columbus, Ohio...*pp. 376, 377*
Robbins Engineering Co., Old Colony Bldg., Chicago, Ill.
WELLER MFG. CO., 1820-1856 N. Kostner Ave., Chicago, Ill...*p. 381*

COAL TIPPLES
FAIRBANKS-MORSE & CO., 900 S. Michigan Ave., Chicago, Ill...*p. 41*
Helmick Foundry & Machine Co., Fairmont, W. Va.
Heyl & Patterson, Inc., 51 Water St., Pittsburgh, Pa.
JEFFREY MFG. CO., 904 N. 4th St.. Columbus, Ohio...*pp. 376, 377*

COAL WASHERS
Pittsburgh Coal Washer Co., Fulton Bldg., Pittsburgh, Pa.
WELLER MFG. CO., 1820-1856 N. Kostner Ave., Chicago, Ill...*p. 381*

COALING STATIONS (Locomotive)
Burr Co., Champaign, Ill.
*GIFFORD-WOOD CO., Hudson, N. Y...*p. 372*
HUNT, C. W. CO., (INC.), West New Brighton, Staten Island, N. Y...*pp. 374, 375*
ROBINS CONVEYING BELT CO., Park Row Bldg., New York, N. Y...*p. 373*
WELLER MFG. CO., 1820-1856 N. Kostner Ave., Chicago, Ill...*p. 381*

COATINGS
—Boiler Setting
HAYS, JOS. W. CORP'N, ("Bestix"), Michigan City, Ind...*p. 232*
Standard Chemical Corp'n. ("Protecto Coat"), Kalamazoo, Mich.
Vulcan Fuel Economy Co., 829-A Transportation Bldg., Chicago, Ill.
—Metal Protecting
SILUMITE PRODUCTS CORPN., 1410 Morris Bldg., Philadelphia, Pa...*p. 663*
Vulcan Fuel Economy Co., 829-A Transportation Bldg., Chicago, Ill.

COCKS
—Air
AMERICAN INJECTOR CO., Detroit, Mich. ..*p. 217*
KELLY & JONES CO., Greensburg, Pa...*pp. ..182, 183*
WESTINGHOUSE TRACTION BRAKE CO., Wilmerding, Pa...*pp. 550, 551*
—Ball
D'ESTE, JULIAN CO., 26 Canal St., Boston, Mass...*pp. 206, 207*
—Blowoff
Cadman, A. W. Mfg. Co., 2814 Smallman St., Pittsburgh, Pa.
Coale Muffler & Safety Valve Co., ("Riggin"), 325 E. Oliver St., Baltimore, Md.

Digitized by Google

*CRANE CO., 836 S. Michigan Ave., Chicago, Ill...*pp. 170, 171, 172, 173*
*HOMESTEAD VALVE MFG. CO., P. O. Box 1754, Pittsburgh, Pa...*p. 177*
Judson Governor Co., Rochester, N. Y.
*LUNKENHEIMER CO., Cincinnati, Ohio...*pp. 184, 185, 186, 187, 188, 189*
McRae & Roberts Co., 211 Campbell Ave., Detroit, Mich.
*PITTSBURGH VALVE FOUNDRY & CONSTRUCTION CO., P. O. Box 1016, Pittsburgh, Pa...*pp. 192, 193*
*READING VALVE & FITTINGS CO., Pratt & Cady Div., Hartford, Conn...*pp. 194, 195*

—Cylinder

BUCKEYE IRON & BRASS WORKS, Dayton, Ohio...*p. 168*
*CRANE CO., 836 S. Michigan Ave., Chicago, Ill...*pp. 170, 171, 172, 173*
*CROSBY STEAM GAGE & VALVE CO., 40 Central St., Boston, Mass...*pp. 202, 208*
Frasse, Peter A. & Co., 417 Canal St., New York, N. Y.
KELLY & JONES CO., Greensburg, Pa...*pp. 182, 183*
McRae & Roberts Co., 211 Campbell Ave., Detroit, Mich.
Nicholson, W. H. & CO., 12 Oregon St., Wilkes-Barre, Pa.
Watertown Specialty Co., 112 E. Moulton St., Watertown, N. Y.

—Gage

AMERICAN INJECTOR CO., Detroit, Mich. ..*p. 217*
AMERICAN STEAM GAUGE & VALVE MFG. CO., Boston, Mass...*pp. 200, 201*
Bonar, James & Co., 502 Park Bldg., Pittsburgh, Pa.
BUCKEYE IRON & BRASS WORKS, Dayton, Ohio...*p. 168*
Chaplin-Fulton Mfg. Co. ("Bingham") 28-36 Penn Ave., Pittsburgh, Pa.
Cleveland Flue Cleaners Mfg. Co., ("Diamond"), Cleveland, O.
*CRANE CO., 836 S. Michigan Ave., Chicago, Ill...*pp. 170, 171, 172, 173*
*CROSBY STEAM GAGE & VALVE CO., 40 Central St., Boston, Mass...*pp. 202, 208*
Hills-McCanna Co., 2025 Elston Ave., Chicago, Ill.
Huyette, Paul B. Co., (The) (Inc.), ("P B H"), 5 So. 18th St., Phila., Pa.
*JENKINS BROS., 80 White St., New York, N. Y...*pp. 180, 181*
KELLY & JONES CO., Greensburg, Pa...*pp. 182, 183*
LONERGAN, J. E. CO., 211-215 Race St., Philadelphia, Pa...*pp. 203, 289*
*LUNKENHEIMER CO., ("Excelsior", "Renewo"), Cincinnati, Ohio...*pp. 184. 185, 186, 187, 188, 189*
McRae & Roberts Co., 211 Campbell Ave., Detroit, Mich.
NASON MFG. CO., ("Aetna", "Olympus"), 71 Fulton St., New York, N. Y... *p. 216*
*PITTSBURGH VALVE, FOUNDRY & CONSTRUCTION CO., P. O. Box 1016, Pittsburgh, Pa...*pp. 192, 193*
Reliance Gauge Column Co., ("Reliance") 5902 Carnegie Ave., Cleveland, Ohio.
Rich Mfg. Co., 370 Atlantic Ave., Boston, Mass.
United Brass Mfg. Co., Cleveland, Ohio.
Williams Gauge Co., 543 Fourth Ave., Pittsburgh, Pa.

—Oil Regulating

*BEST, W. N. FURNACE & BURNER CORP'N., 11 Broadway, ("Calorex") New York, N. Y...*pp. 130, 531*

—Priming

Detroit Brass & Malleable Wks., 331 Holden Ave., Detroit, Mich.
Essex Brass Corp'n., 2000 Franklin St., Detroit, Mich.
Michigan Lubricating Co., 3643 Beaubien St., Detroit, Mich.

—Three-Way and Four-Way

AMERICAN STEAM GAUGE & VALVE MFG. CO., Boston, Mass...*pp. 200, 201*
Bordo, L. J. Co., 12th & Thompson Sts., Philadelphia, Pa.
BUCKEYE IRON & BRASS WORKS, Dayton, Ohio...*p. 168*
*CRANE CO., 836 S. Michigan Ave., Chicago, Ill...*pp. 170, 171, 172, 173*
*CROSBY STEAM GAGE & VALVE CO., 40 Central St., Boston, Mass...*pp. 202, 208*
*HOMESTEAD VALVE MFG. CO., P. O. Box 1754, Pittsburgh, Pa...*p. 177*
LONERGAN, J. E. CO., 211-215 Race St., Philadelphia, Pa...*pp. 203, 289* ..
*LUNKENHEIMER CO., Cincinnati, Ohio...*pp. 184, 185, 186, 187, 188, 189*
*PITTSBURGH, VALVE, FOUNDRY & CONSTRUCTION CO., P. O. Box 1016, Pittsburgh, Pa...*pp. 192, 193*
*READING VALVE & FITTINGS CO., Pratt & Cady Div., Hartford, Conn...*pp. 194, 195*

—Tuyere (Blast Furnace)

Pittsburgh Brass Mfg. Co., 3155 Penn Ave., Pittsburgh, Pa.

—Two-Way

*CRANE CO., 836 S. Michigan Ave., Chicago, Ill...*pp. 170, 171, 172, 173*

COFFEE MACHINERY

Squire, Geo. L. Mfg. Co., Buffalo, N. Y.

COILS

—Pipe

Albright, Son & Co., Allentown, Pa.
AUTOMATIC REFRIGERATING CO., Hartford, Conn...*p. 629*
*BADGER, E. B. & SONS CO., 75 Pitts St., Boston, Mass...*p. 164*
Best Co., 1409 Arvott Bldg., Pittsburgh, Pa.
*CRANE CO., 836 S. Michigan Ave., Chicago, Ill...*pp. 170, 171, 172, 173*
*DOUGHERTY, M. J. CO., 25th & Washington Ave., Philadelphia, Pa...*p. 234*
Everitt Co., 261 Franklin St., Boston, Mass.
Harris, Arthur & Co., 212 Curtis St., Chicago, Ill.
Lewis, Joseph E., 1218 Warner St., Baltimore, Md.
NATIONAL PIPE BENDING CO., New Haven, Conn...*pp. 150, 151*
Philadelphia Pipe Bending Co., 4135-65 N. 5th St., Philadelphia, Pa.
Pipe Coiling Bending & Welding Co., Grant Ave. & B. & O. RR., Sharpsburg, Pa.
Pittsburgh Pipe Coil & Bending Co., P. O. Box 975, Pittsburgh, Pa.
Power Piping Co., Beaver & Western Ave., Pittsburgh, Pa.
Roessing Mfg. Co., Sharpsville Sta., Pittsburgh, Pa.
SIMMONS PIPE BENDING WORKS, 40 Mechanic Street, Newark, N. J...*p. 235*
*SUPERHEATER COMPANY, ("Elesco"), 17 East 42d Street., New York, N. Y...*p. 98*
YORK MFG. CO., York, Pa...*p. 631*

—Refrigerating

*DE LA VERGNE MACHINE CO., 1123 E. 138th St., New York, N. Y...*p. 40*
NATIONAL PIPE BENDING CO., New Haven, Conn...*pp. 150, 151*
*VILTER MFG. CO., 1194-1196 Clinton St., Milwaukee, Wis...*pp. 16, 17*

Co

Digitized by Google

*VOGT, HENRY MACHINE CO., Louisville, Ky...*pp. 632, 633*
YORK MFG. CO., York, Pa...*p. 631*

COKE OVEN MACHINERY
*BROWN HOISTING MACHINERY CO., Cleveland, Ohio...*p. 390*
Burr Co., Champaign, Ill.
*CASEY-HEDGES CO., Chattanooga, Tenn...*pp. 60, 61*
Heyl & Patterson, Inc., 51 Water St., Pittsburgh, Pa.
Marshall Foundry Co., 1st Nat'l Bank Bldg., Pittsburgh, Pa.
WELLER MFG. CO., 1820-1856 N. Kostner Ave., Chicago, Ill...*p. 381*

COLD ROLLING MACHINERY
BLAKE & JOHNSON CO., Waterbury, Conn...*p. 491*

COLD STORAGE PLANTS
Armstrong Machinery Co., 3201-3219 E. Riverside, Spokane, Wash.
AUTOMATIC CARBONIC MACHINE CO., Peoria, Ill...*p. 628*
AUTOMATIC REFRIGERATING CO., Hartford, Conn...*p. 629*
Castle Refrigerating Machine Co., Indianapolis, Ind.
*DE LA VERGNE MACHINE CO., 1123 E. 138th St., New York, N. Y...*p. 40*
Harris Ice Machine Works, 174 E. Water St., Portland, Ore.
*JOHNS-MANVILLE (Inc.), New York, N. Y...*p. 244*
Ruemmeli-Dawley Mfg. Co., 3923 Chouteau Ave., St. Louis, Mo.
*VILTER MFG. CO., 1194-1196 Clinton St., Milwaukee, Wis...*pp. 16, 17*
*VOGT, HENRY MACHINE CO., Louisville, Ky...*pp. 632, 633*
YORK MFG. CO., York, Pa...*p. 631*

COLLARS (Shaft)
AMERICAN TOOL & MACHINE CO., Boston 9, Mass...*p. 614*
*CALDWELL, H. W. & SON CO., 17th St. & Western Ave., Chicago, Ill...*p. 370*
*CALDWELL, W. E. CO., 340 E. Brandeis St., Louisville, Ky...*p. 323*
CHICAGO PULLEY & SHAFTING CO., 30 So. Clinton St., Chicago, Ill...*pp. 324, 325*
DODGE SALES & ENGINEERING CO., Mishawaka, Ind...*pp. 42, 43, 326, 327, 328, 329*
*FALLS CLUTCH & MACHINERY CO., Cuyahoga Falls, Ohio...*p. 330*
*HILL CLUTCH CO., Cleveland, Ohio...*p. 331*
JEFFREY MFG. CO., 904 N. 4th St., Columbus, Ohio...*pp. 376, 377*
*MEDART PATENT PULLEY CO., St. Louis, Mo...*p. 333*
Middletown Machine Co., Middletown, Ohio.
Pittsburgh Grinding Wheel Co., Rochester, Pa.
*ROYERSFORD FOUNDRY & MACHINE CO., (INC.), 52 N. 5th St., Philadelphia, Pa...*pp. 346, 347*
Safety First Manufacturing Co., ("Bull Dog"), Alexandria, Va.
Standard Pressed Steel Co., Jenkintown, Pa.
WELLER MFG. CO., 1820-1856 N. Kostner Ave., Chicago, Ill...*p. 381*
WILLIAMS, J. H. & CO., 70 Richards St., Brooklyn, N. Y...*p. 517*
*WOOD'S, T. B., SONS CO., Chambersburg, Pa...*pp. 334, 335*

COLLETS
PRATT & WHITNEY CO., 111 Broadway, New York, N. Y...*p. 471*
Quick Action Chuck Corp'n, Grand Rapids, Mich.

COLORING (Metal)
*AMERICAN METAL TREATMENT CO. ("Carbonia"), Elizabeth, N. J. *p. 535*

COLUMNS AND GRASS, STRUCTURAL
American Cast Iron Pipe Co., Birmingham, Ala.
CLOW, JAMES B. & SONS, 534 So. Franklin St., Chicago, Ill...*pp. 230, 231*
*U. S. CAST IRON PIPE & FOUNDRY CO., Burlington, N. J...*pp. 232, 233*

COMBUSTION CHAMBER ARCHES
(See Arches, Combustion Chamber)

COMBUSTION CONTROL
(See Gas Analysis Apparatus)

COMBUSTION CONTROL SYSTEMS
*ENGINEER CO., ("Balanced Draft") 17 Battery Place, New York...*pp. 108, 109*

COMBUSTION (CO_2) RECORDERS
*FOXBORO CO., (INC.), Foxboro, Mass...*p. 293*
HAYS, JOS. W., CORP'N., Michigan City, Ind...*p. 282*
MONO CORP'N. OF AMERICA ("Mono"), 25 W. Broadway, New York, N. Y...*p. 283*
*PRECISION INSTRUMENT CO., Newark, N. J...*pp. 284, 285*
*REPUBLIC FLOW METERS CO., 2240 Diversey Parkway, Chicago, Ill...*p. 281*
*SARCO CO., (INC.), 9 Barclay St., New York, N. Y...*pp. 224, 225*
*UEHLING INSTRUMENT CO., 2011 Empire Bldg., New York, N. Y...*p. 286*

COMPOUNDS
—Boiler
Arrow Boiler Compound Co., ("Arrow"). 3908 Olive St., St. Louis, Mo.
Beltine Chemical & Mfg. Co., ("Solvine"). 6155 Wentworth Ave., Chicago, Ill.
Binghamton Boiler Compound Co., Binghamton, N. Y.
Bird-Archer Co., 90 West St., New York.
Black Bear Co., 138-144 Temple St., Long Island City, N. Y.
Boiler-Kote Co., 608 S. Dearborn St., Chicago, Ill.
Champion Compound Co., 28 South Delaware Ave., Philadelphia, Pa.
Crown Mfg. Co., Cleveland, O.
Dearborn Chemical Co., 332 S. Michigan Ave., Chicago, Ill.
Engineering Supply Co., 2238 N. 9th St., Philadelphia, Pa.
Ferrochem Co., (Ltd.), 30 Church St., New York, N. Y.
Harris, A. W. Oil Co., 326 S. Water St., Providence, R. I
Hawk-Eye Compound Co., ("Hawk-Eye"). Blue Island, Suburb of Chicago, Ill.
HAYS, JOS. W. CORPN., ("Spitzerinktum"), Michigan City, Ind...*p. 282*
International Boiler Cleaning Co. ("Scaline"), 341-343 N. Calvert St., Baltimore, Md.
International Boiler Compound Co., 140-142 W. Austin Ave., Chicago, Ill.
Lake Erie Mfg. Co., Inc., 192-198 Chicago St., Buffalo, N. Y.
Lord, George W., Co., ("Lord's"). 3307-09 Germantown Ave., Philadelphia, Pa.
Lynch-Clarisey Co., 3211-3213 S. Wood St., Chicago, Ill.
McVicker, W. B. Co., 295 Douglass St., Brooklyn, N. Y.
National Boiler Specialties Co., Elgin, Ill.
O'Brien Oil & Chemical Co., St. Louis, Mo.
Paige & Jones Chemical Co., 15 E. 40th St., New York, N. Y.
Perolin Co. of America, 2010 Peoples Gas Bldg., Chicago, Ill.
Russell-Kinkaid Co., 2729-31 Quinn St., Chicago, Ill.

Digitized by Google

Shawmut Chemical Co., 42 Batterymarch St., Boston, Mass.
Standard Chemical Corp'n., ("Protecto"), Kalamazoo, Mich.
Star Oil Co., 342 No. Irving St., Chicago, Ill.
Tegufilm Chemical Mfg. Co., Inc. ("Tegufilm"), 112-14-16 Pearl St., Syracuse, N. Y.
Unisol Mfg. Co., Jersey City, N. J.
Warley, Thos. C. & Co., 227 S. Front St. Philadelphia, Pa.

—Casehardening
Bell & Gossett Co. ("Caselite"), 317 N. Dearborn St., Chicago, Ill.
Kasenit Co., 30 So. Williams St., New York, N. Y.
Shore Instrument & Mfg Co. ("Localhard"), 9025-9029 Van Wyck Ave., Jamaica, N. Y.

—Core
Federal Foundry Supply Co., Cleveland, O.

—Cutting
American Oil Products Co., 1426 Seneca St., Buffalo, N. Y.
Atlantic Refining Co., 2144 Passyunk Ave., Philadelphia, Pa.
Fiske Bros. Refining Co., 24 State St., New York, N. Y.
Franklin Oil & Gas Co., Bedford, O.
Houghton, E. E. & Co., 240 W. Somerset St., Philadelphia, Pa.
Jobbers Mfg. Co., ("Blue Ribbon"), 327 S. La Salle St., Chicago, Ill.
Kramer, W. J. Co., 214-216 Reed St., Milwaukee, Wis.
Oil City Oil & Grease Co., Oil City, Pa.
Stuart, D. A. & Co., 350-360 E. Illinois St., Chicago, Ill.
Swan & Finch Co. (Larcul"), 522 5th Ave., New York, N. Y.
Universal Oil Co., 38 Fulton St., New York, N. Y.
Warley, Thos. C. & Co., 227 S. Front St., Philadelphia, Pa.
White & Bagley Co. ("Economy"), 100 Foster St., Worcester, Mass.
White Star Refining Co., 614 Avery Ave., Detroit, Mich.

—Elevator
McVicker, W. B. Co., 295 Douglass St., Brooklyn, N. Y.
Warley, Thos. C. & Co., 227 S. Front St., Philadelphia, Pa.

—Fire-Resistant
Clifford, Wm. & Sons Co. ("Resisto"), 369 Union Ave., Elizabeth, N. J.

—Grinding
Carborundum Co., Niagara Falls, N. Y.
Clover Mfg. Co., Norwalk, Conn.
Jones Ball Co., ("Acme"), P. O. Box 36, Arlington Heights, Mass.
White & Bagley Co. ("Economy"), 100 Foster St., Worcester, Mass.
Worcester Abrasive Co. ("Pep"), 1662 Broadway, New York, N. Y.

—Lapping
Clover Mfg. Co., Norwalk, Conn.

—Leather Finishing
Borne, Scrymser Co., 80 South St., New York, N. Y.

—Slushing
Warren Bros. Co., 9 Cambridge St., Boston, Mass.

—Tempering
Metal Hardening Solution Co., Bankers Place, Rochester, N. Y.

COMPRESSED AIR METERS
(See Meters, Compressed Air)

COMPRESSORS

—Air
*ALLIS-CHALMERS MFG. CO., Milwaukee, Wis...*pp. 22, 23, 28, 29*
American Air Compressor Works, 26 Cortlandt St., New York, N. Y.
BEACH-RUSS CO., 50 Church St., New York, N. Y...*p. 560*
AMERICAN STEAM PUMP CO., Battle Creek, Mich...*p. 562*
Black & Decker Mfg. Co. ("Lectroflater"), 109-15 S. Calvert St., Baltimore, Md.
Brunner Mfg. Co., Utica, N. Y.
BURY COMPRESSOR CO., 1701 Cascade St., Erie, Pa...*p. 545*
CHICAGO PNEUMATIC TOOL CO. ("Chicago Pneumatic"), 6 E. 44th St., New York, N. Y...*p. 548*
Christensen Engineering Co., 1813 Fond du Lac Ave., Milwaukee, Wis.
Clark & Norton Mfg. Co., Wellsville, N. Y.
Crowell Mfg. Co., 296 Taaffe Place, Brooklyn, N. Y.
Curtis Pneumatic Machinery Co., St. Louis, Mo.
*DE LAVAL STEAM TURBINE CO., Trenton, N. J...*p. 22*
*DE LA VERGNE MACHINE CO., 1123 E. 138th St., New York, N. Y...*p. 40*
Dow Pump & Diesel Engine Co., Alameda, Cal.
FAIRBANKS-MORSE & CO., 900 S. Wabash Ave., Chicago, Ill.
GENERAL ELECTRIC CO., Schenectady, N. Y...*pp. 18, 19, 20, 21*
Hall Steam Pump Co., Pittsburgh, Pa.
Hardie-Tynes Mfg. Co., 8th Ave. & 28th St., Birmingham, Ala.
Harris Ice Machine Works, 174 E. Water St., Portland, Ore.
Hayman & Co., 801-805 E. Pratt St., Baltimore, Md.
HOLMES, ROBT. & BROS. (Inc.), Danville, Ill...*pp. 386, 387*
HOOVEN, OWENS, RENSCHLER CO., Hamilton, Ohio...*p. 10*
HOPE ENGINEERING & SUPPLY CO. ("Reeves"), Mt. Vernon, Ohio...*p. 49*
Indiana Air Pump Co., 812 K. of P. Bldg., Indianapolis, Ind.
*INGERSOLL-RAND CO. ("Ingersoll-Rand," "Imperial"), 11 Broadway, New York, N. Y...*pp. 546, 547*
Jackson Compressor Co. 235 So. Cheroke St., Denver, Colo.
Janette Mfg Co., 556 W Monroe St., Chicago, Ill.
Lane & Bodley Co., Bond Hill, Cincinnati, O.
Miller Improved Gas Engine Co., Springfield O.
NORDBERG MFG. CO., Milwaukee, Wis...*p. 11*
Norwalk Iron Works Co., So. Norwalk, Conn.
*PANGBORN CORP'N, P. O. Box 859, Hagerstown, Md...*pp. 636, 637*
Pennsylvania Pump & Compressor Co., Easton, Pa.
St. Louis Iron & Machine Works, 126 Chouteau Ave., St. Louis, Mo.
Stratton & Bragg Co., Petersburg, Va.
SULLIVAN MACHINERY CO., 120 S. Michigan Ave., Chicago, Ill...*p. 549*
*TITUSVILLE IRON WORKS CO., Titusville, Pa...*p. 89*
Turbine Equipment Co., 50 Church St., New York.
*UNION STEAM PUMP CO., Battle Creek, Mich...*p. 582*
Utility Compressor Co., 1161-1165 Harper Ave., E., Detroit, Mich.
*VILTER MFG. CO., 1194-1196 Clinton St., Milwaukee, Wis...*pp. 16, 17*

Co

Digitized by Google

Weber Subterranean Pump Co., 50 E. 42nd St., New York, N. Y.
WESTINGHOUSE TRACTION BRAKE CO., Wilmerding, Pa...*pp. 550, 551*
*WORTHINGTON PUMP & MACHINERY CORP'N, 115 Broadway, New York, N. Y...*pp. 44, 45, 46, 47*

—Air, Compound
Gardner Governor Co., Quincy, Ill.
*INGERSOLL-RAND CO. ("Ingersoll-Rand," "Imperial"), 11 Broadway, New York, N. Y...*pp. 546, 547*
NORDBERG MFG. CO., Milwaukee, Wis...*p. 11*
WESTINGHOUSE TRACTION BRAKE CO., Wilmerding, Pa. *pp. 550, 551*
*WORTHINGTON PUMP & MACHINERY CORP'N, 115 Broadway, New York, N. Y...*pp. 44, 45, 46, 47*

—Ammonia
AUTOMATIC REFRIGERATING CO., Hartford, Conn...*p. 629*
Chuse Engine & Manufacturing Co., Mattoon, Ill.
Howe Ice Machine Co., 2825 Montrose Ave., Chicago, Ill.
Mayer Ice Machine & Engineering Co., Westside & Grant Aves., Jersey City, N. J.
St. Louis Iron & Machine Works, 125 Chouteau Ave., St. Louis, Mo.
*VILTER MFG. CO., 1194-1196 Clinton St., Milwaukee, Wis...*pp. 16, 17*
*WORTHINGTON PUMP & MACHINERY CORPN., 115 Broadway, New York, N. Y...*pp. 44, 45, 46, 47*
YORK MFG. CO., York, Pa...*p. 631*

—Centrifugal
*DE LAVAL STEAM TURBINE CO., Trenton, N. J...*p. 22*

—Gas
Bessemer Gas Engine Co., Grove City, Pa.
BURY COMPRESSOR CO., 1701 Cascade St., Erie, Pa...*p. 545*
CHICAGO PNEUMATIC TOOL CO. ("Chicago Pneumatic"), 6 E. 44th St., New York, N. Y...*p. 548*
Clark Bros. Co., Olean, N. Y.
Clark & Norton Mfg. Co., Wellsville, N. Y.
*DE LAVAL STEAM TURBINE CO., Trenton, N. J...*p. 22*
Hall Steam Pump Co., Pittsburgh, Pa.
HOOVEN, OWENS, RENTSCHLER CO., Hamilton, Ohio...*p. 10*
HOPE ENGINEERING & SUPPLY CO. ("Reeves"), Mt. Vernon, Ohio...*p. 49*
*INGERSOLL-RAND CO. ("Ingersoll-Rand," "Imperial"), 11 Broadway, New York, N. Y...*pp. 546, 547*
Miller Improved Gas Engine Co., Springfield, O.
Nash Engineering Co. ("Hytor"), South Norwalk, Conn.
NORDBERG MFG. CO., Milwaukee, Wis...*p. 11*
Norwalk Iron Works Co., So. Norwalk, Conn.
Pattin Bros. Co., Marietta, Ohio.
SULLIVAN MACHINERY CO., 120 S. Michigan Ave., Chicago, Ill...*p. 549*
*VILTER MFG. CO., 1194-1196 Clinton St., Milwaukee, Wis...*p. 16, 17*
*WORTHINGTON PUMP & MACHINERY CORP'N., 115 Broadway, New York, N. Y...*pp. 44, 45, 46, 47*
YORK MFG. CO., York, Pa...*p. 31*

—Oxygen-Hydrogen
ELECTROLABS CO., Pittsburgh, Pa...*p. 536*

CONCENTRATING MACHINERY
*ALLIS-CHALMERS MFG. CO., Milwaukee, Wis...*pp. 28, 29*
Traylor Engr. & Mfg. Co., Allentown, Pa.

CONCRETE DISTRIBUTING EQUIPMENT
Insley Mfg. Co., E. St. Clair & Onley Sts., Indianapolis, Ind.
Ransome Concrete Machinery Co., Dunellen, N. J.

CONCRETE INSERTS
Concrete Steel Co., 42 Broadway, New York, N. Y.
DIAMOND EXPANSION BOLT CO. ("Diamond"), 90 West St., cor. Cedar, New York, N. Y...*p. 526*
*HILL CLUTCH CO., Cleveland, Ohio...*p. 331*

CONCRETE MIXING MACHINES
(See Mixers, Concrete)

CONCRETE REINFORCEMENT
*BROWN HOISTING MACHINERY CO., Cleveland, Ohio...*p. 390*
Concrete Steel Co. ("Havemeyer"), 42 Broadway, New York, N. Y.
Penn Metal Co. ("Penco"), 65 Franklin St., Boston, Mass.

—Mesh
Wichwire Spencer Steel Corp'n, Worcester, Mass.

CONDENSATION RETURN SYSTEMS
ECONOMY PUMPING MACHINERY CO., 104-118 No. Curtis St., Chicago, Ill...*p.* 568
*HOBSON, RUSSEL B. ("Holly Gravity"), 120 Broadway, New York, N. Y...*p. 548*
Plant Engineering & Equipment Co. (Inc.), 192 Broadway, New York, N. Y.

CONDENSER TUBES
(See Tubes, Condensers)

CONDENSERS
BIGGS BOILER WORKS CO., Case Ave. & Newton St., Akron, Ohio...*p. 650*
Sauer Power Generating Co., 5115 Rosetta St., Pittsburgh, Pa.
STANDARD WATER SYSTEMS CO., Hampton, N. J...*p. 144*

—Ammonia
American Carbonic Machinery Co., Wisconsin Rapids, Wis.
AUTOMATIC REFRIGERATING CO., Hartford, Conn...*p. 629*
Continental Machinery Co., 111 West Monroe St., Chicago, Ill.
*DE LA VERGNE MACHINE CO., 1123 E. 138th St., New York, N. Y...*p. 40*
Harris Ice Machine Works, 174 E. Water St., Portland, Ore.
New Method Utilities Co., 45 Academy St., Newark, N. J.
*U. S. CAST IRON PIPE & FOUNDRY CO., Burlington, N. J...*pp. 232, 233*
*VILTER MFG. CO., 1194-1196 Clinton St., Milwaukee, Wis...*pp. 16, 17*
*VOGT, HENRY MACHINE CO., Louisville, Ky...*pp. 632, 633*
Western Gas Construction Co., Fort Wayne, Ind.
YORK MFG. CO., York, Pa...*p. 631*

—Barometric
*ALLIS-CHALMERS MFG. CO., Milwaukee, Wis...*pp. 28, 29*
*INGERSOLL-RAND CO., 11 Broadway, New York, N. Y...*pp. 546, 547*
Mesta Machine Co., Box 1124, Pittsburgh, Pa.
*U. S. CAST IRON PIPE & FOUNDRY CO., Burlington, N. J...*pp. 232, 233*
*WESTINGHOUSE ELECTRIC & MFG. CO., E. Pittsburgh, Pa...*pp. 160, 161*
*WHEELER CONDENSER & ENGINEERING CO., Carteret, N. J...*p. 162*
*WHEELER, C. H. MFG. CO., Sedgley & Lehigh Aves., Philadelphia, Pa...*p. 163*
*WORTHINGTON PUMP & MACHINERY CORPN., 115 Broadway, New York, N. Y...*pp. 44, 45, 46, 47*

Digitized by Google

—Electrical
*ALLIS-CHALMERS MFG. CO., Milwaukee, Wis...*pp. 28, 29*

—Jet
*ALLIS-CHALMERS MFG. CO., Milwaukee, Wis...*pp. 28, 29*
AMERICAN STEAM PUMP CO., Battle Creek, Mich,..*p. 562*
Blake Pump & Condenser Co., Fitchburg, Mass.
Dean Bros. Steam Pump Works, Indianapolis, Ind.
DEVINE, J. P. CO., 1375 Clinton St., Buffalo, N. Y...*pp. 606, 607*
Elliott Co. (''Elliott-Ehrhart''), Jeannette, Pa.
*INGERSOLL-RAND CO., 11 Broadway, New York, N. Y...*pp. 546, 547*
Gearfott Engineering Co. (Inc.), 95 Liberty St., New York, N. Y.
*SCHUTTE & KOERTING CO., 1184 Thompson St., Philadelphia, Pa...*p. 159*
*UNION STEAM PUMP CO., Battle Creek, Mich...*p. 582*
*U. S. CAST IRON PIPE & FOUNDRY CO., Burlington, N. J...*pp. 232, 233*
WARREN STEAM PUMP CO., Warren, Mass...*p. 583*
*WESTINGHOUSE ELECTRIC & MFG. CO., East Pittsburgh, Pa...*pp. 160, 161*
*WHEELER CONDENSER & ENGINEERING CO., Carteret, N. J...*p. 162*
*WHEELER, C. H. MFG. CO., Sedgley & Lehigh Aves., Philadelphia, Pa...*p. 162*
WOOD, R. D. & CO., Philadelphia, Pa...*p. 597*
*WORTHINGTON PUMP & MACHINERY CORP'N, 115 Broadway, New York, N. Y...*pp. 44, 45, 46, 47*

—Jet, Rotary
MANISTEE IRON WORKS CO. (''Roturbo''), Manistee, Mich...*pp 158, 576*
*WHEELER CONDENSER & ENGINEERING CO., Carteret, N. J...*p. 162*
WOOD, R. D. & CO., Philadelphia, Pa. *p. 597*

—Oil
*U. S. CAST IRON PIPE & FOUNDRY CO., Burlington, N. J...*pp. 232, 233*

—Surface
Alberger Pump & Condenser Co. (''Alberger''), 140 Cedar St., New York.
*ALLIS-CHALMERS MFG. CO., Milwaukee, Wis...*pp. 28, 29*
American Condenser & Engineering Corp'n, 120 Broadway, New York, N. Y.
*BRAUN, C. F. & CO., San Francisco, Cal. *pp. 156, 157*
DEVINE, J. P. CO., 1375 Clinton St., Buffalo, N. Y...*pp. 606, 607*
HONHORST, JOS. CO., 1016-20 W. 6th St., Cincinnati, Ohio...*p. 654*
*INGERSOLL-RAND CO., 11 Broadway, New York, N. Y...*pp. 546, 547*
Ross Heater & Mfg. Co. (Inc.), 1407 West Ave., Buffalo, N. Y.
*UNION STEAM PUMP CO., Battle Creek, Mich...*p. 582*
*U. S. CAST IRON PIPE & FOUNDRY CO., Burlington, N. J...*pp. 232, 233*
*WESTINGHOUSE ELECTRIC & MFG. CO., East Pittsburgh, Pa...*pp. 160, 161, 176, 177*
*WHEELER CONDENSER & ENGINEERING CO., Carteret, N. J...*p. 162*
*WHEELER, C. H. MFG. CO., Sedgley & Lehigh Aves., Philadelphia, Pa...*p. 162*
WOOD, R. D. & CO., Philadelphia, Pa...*p. 597*
*WORTHINGTON PUMP & MACHINERY CORP'N, 115 Broadway, New York, N. Y. *pp. 44, 45, 46, 47*

CONDUIT
—Electrical
Central Tube Co., 1st National Bank Bldg., Pittsburgh, Pa.
Eastern Tube & Tool Co., (Inc.), 594 Johnson Ave., Brooklyn, N. Y.
Garland Mfg. Co., Lawrence Co., West Pittsburgh, Pa.
*JOHNS-MANVILLE (Inc.), New York, N. Y...*p. 244*
Pratt Chuck Co., Frankfort, N. Y.

—Fibre
DIAMOND STATE FIBRE CO., Bridgeport, Pa...*p. 420*
*JOHNS-MANVILLE (Inc.), New York, N. Y...*p. 244*

—Metal, Flexible
AMERICAN METAL HOSE CO., Waterbury, Conn...*p. 262*

—Underground
*JOHNS-MANVILLE (Inc.), New York, N. Y...*p. 244*
Ric-Wil Co., 522 Guardian Bldg., Cleveland, Ohio.

—Wood
Wyckoff Pipe & Creosoting Co., 30 E. 42nd St., New York, N. Y.

CONFECTIONERS MACHINERY
Murkland, J. W. Co., Barton, Vt.

CONNECTING RODS
Leard, Wm. Co., 16th St. & 5th Ave., New Brighton, Pa.
Standard Gauge Steel Co., Beaver Falls, Pa.
VULCAN STEAM FORGING CO., 247 Rano St., Buffalo, N. Y...*p. 488*
WILLIAMS, J. H. & CO., 70 Richards St., Brooklyn, N Y...*p. 517*

CONTACT POINTS (ELECTRIC)
—Silver and Platinum
Wilson, H. A. Co., 97 Chestnut St., Newark, N. J.

CONTROLLERS
—Automatic, Temperature or Pressure (See Regulators)
—Electric
Allen-Bradley Co, 286 Greenfield Ave., Milwaukee, Wis.
Automatic Switch Co., 154 Grand St., New York, N. Y.
Cline Electric Mfg. Co, Fisher Bldg., Chicago, Ill.
Cutler-Hammer Mfg. Co., 12th St. & St. Paul Ave., Milwaukee, Wis.
Electric Controller & Mfg. Co., 2700 E. 79th St., Cleveland, Ohio.
Fort Wayne Engineering & Mfg. Co. (''Paul''), Fort Wayne, Ind.
*GENERAL ELECTRIC CO., Schenectady, N. Y...*pp. 18, 19, 20, 21*
Industrial Controller Co., Milwaukee, Wis.
Sundh Electric Co., 209 Parkhurst St., Newark, N. J.
*WESTINGHOUSE ELECTRIC & MFG. CO., East Pittsburgh, Pa...*pp. 160, 161*
Wheeler-McDowell Elevator Co., 417-421 Canal St., New York, N. Y.

—Elevator
Maintenance Co. (Inc.), 449-53 West 42nd St., New York, N. Y.
*WESTINGHOUSE ELECTRIC & MFG. CO., East Pittsburgh, Pa. *pp. 160, 161*
Wheeler-McDowell Elevator Co., 417-421 Canal St., New York.

—Elevator Signal
Kingsbridge Machine Works, Kingsbridge, New York, N. Y.
*WESTINGHOUSE ELECTRIC & MFG. CO., East Pittsburgh, Pa...*pp. 160, 161*

Co

Digitized by Google

—Feed Water
(See Regulators, Feed Water)

—Filter Rate
*BUILDERS IRON FOUNDRY, Providence, R. I...*p. 277*
SIMPLEX VALVE & METER CO., Philadelphia, Pa...*p. 278*

—Liquid Level
FISHER GOVERNOR CO. (''Fisher''), Marshalltown, Iowa...*p. 219*
*FOXBORO CO. (Inc.), Foxboro, Mass...*p. 293*
FULTON CO. (''Sylphon''), Knoxville, Tenn. *pp. 218, 219*
NASON MFG. CO. (''Multiservis''), 71 Fulton St., New York, N. Y...*p. 216*
SIMPLEX VALVE & METER CO., Philadelphia, Pa...*p. 278*
TAGLIABUE, C. J. MFG. CO., 18-88 33rd St., Brooklyn, N. Y...*p. 297*
Williams Gauge Co, 543 Fourth Ave., Pittsburgh, Pa.

—Time
TAGLIABUE, C. J. MFG. CO., 18-88 33rd St., Brooklyn, N. Y...*p. 296*

CONTROLS, FLEXIBLE WIRE
*GWILLIAM CO. (''Bowden'') 23 Flatbush Ave., Brooklyn, N. Y...*pp. 356, 357, 358*

CONVERTERS, ROTARY (ELECTRIC)
*ALLIS-CHALMERS MFG. CO., Milwaukee, Wis...*pp. 28, 29*
*GENERAL ELECTRIC CO., Schenectady, N. Y...*pp. 18, 19, 20, 21*
Wagner Electric Mfg. Co., 6400 Plymouth Ave., St. Louis, Mo.
*WESTINGHOUSE ELECTRIC & MFG. CO., East Pittsburgh, Pa...*pp. 160, 161*

CONVEYING MACHINERY
Alvey-Ferguson Co., 75 North Ave., Oakley, Cincinnati, Ohio.
Alvey Mfg. Co., 3201 S. Broadway, St Louis, Mo.
American Conveyor Co., 6611 Drexel Ave., Chicago, Ill.
AMERICAN TOOL & MACHINE CO., Boston 9, Mass...*p. 614*
BARTLETT, C. O. & SNOW CO., Cleveland, Ohio...*p. 367*
*CALDWELL, H. W. & SON CO., 17th St. & Western Ave., Chicago, Ill...*p. 370*
Chain Belt Co., Wilwaukee, Wis.
Chicago Automatic Conveyor Co., 11 So. La Salle St., Chicago, Ill.
CONVEYING WEIGHER CO., 90 West St., New York, N. Y...*p. 371*
DODGE SALES & ENGINEERING CO., Mishawaka, Ind...*pp. 42, 43, 326, 327, 328, 329*
Garland M. Co., Bay City, Mich.
*GIFFORD-WOOD CO., Hudson, N. Y...*p. 372*
Godfrey Conveyor Co., Elkhart, Ind.
Gruendler Patent Crusher & Pulverizer Co., 928 N First St., St. Louis, Mo.
*HILL CLUTCH CO., Cleveland, Ohio...*p. 331*
HUNT C. W. CO. (Inc.) West New Brighton Staten Island, N. Y...*pp. 374, 375*
JEFFREY MFG CO., 904 N. 4th St., Columbus, Ohio...*pp. 376, 377*
*JONES, W. A FOUNDRY & MACHINE CO., 4415 West Roosevelt Road, Chicago, Ill. *pp. 312, 313, 314, 315*
LAMSON CO., 100 Boylston St., Boston, Mass...*pp. 378, 379*
LASKER IRON WORKS 3201 So. Lincoln St., Chicago, Ill...*p. 655*
Link Belt Co., 39th & Stewart Ave., Chicago, Ill.
Louden Machinery Co., Fairfield, Iowa.
McKinney-Harrington Co., Markette St., North Chicago, Ill.
Main Belting Co., 917 South 13th St., Philadelphia, Pa.
Mathews Gravity Carrier Co., Ellwood City, Pa.
Mead-Morrison Mfg. Co., Prescott & Orleans Sts., East Boston, Mass.
Mey Chain Belt Co. (Inc.), 82 Washington St., Buffalo, N. Y.
MORRIS, HERBERT (Inc.), 1-15 Lawrence Place, Buffalo, N. Y...*p. 402*
ROBINS CONVEYING BELT CO., Park Row Bldg., New York, N. Y...*p. 373*
Sackett, A. J., 5th Ave. & First St., Baltimore, Md.
*SHEPARD ELECTRIC CRANE & HOIST CO., Montour Falls, N. Y...*pp. 400, 401*
Specialty Engineering Co., Allegheny & Trenton Aves., Philadelphia, Pa.
STANDARD CONVEYOR CO., North St. Paul, Minn...*p. 380*
Stephens-Adamson Mfg. Co., Aurora, Ill.
Tamaqua Mfg. Co., Tamaqua, Pa.
Underwood Machinery Co., 110-120 Mt. Vernon St., South Boston, Mass.
Webster Mfg. Co., 4500-4560 Cortland St., Chicago, Ill.
WELLER MFG. CO., 1820-1856 N. Kostner Ave., Chicago, Ill...*p. 381*
WILLCOX ENGINEERING CO., Saginaw, Mich...*p.. 272, 613*

CONVEYING SYSTEMS

—Light Material
STURTEVANT, B F. CO., Hyde Park, Boston, Mass...*p. 106*
WILLIAMS PATENT CRUSHER & PULVERIZER CO., St. Louis, Mo...*pp. 602, 603*

—Pneumatic
*ALLINGTON & CURTIS MFG. CO., Saginaw, Mich...*p. 554*
Clark Dust Collecting Co., Fisher Bldg., Chicago, Ill.
Guarantee Construction Co., 140 Cedar St., New York, N. Y.
Holly Pneumatic Systems, (Inc.), 145 West 45th St., New York, N. Y.
*LAMSON CO., 100 Boyleston St., Boston, Mass...*pp. 378, 379*
Merrill, C J. (Inc.), 85 Kennebec St., Portland, Me.
National Blow Pipe & Mfg. Co., 738 Dryades St., New Orleans, La.
Northern Blower Co., West 65th & Dennison Ave., Cleveland, Ohio.

—Powdered Coal
*FULLER-LEHIGH CO., Fullerton, Pa...*p. 128*
Grindle Fuel Equipment Co., (''Grindle''), 1901-1911 S. Rockwell St., Chicago, Ill.

CONVEYING WEIGHERS
(See Weighers, Conveying)

CONVEYORS

—Belt
Alvey Mfg. Co., 3201 S. Broadway, St. Louis, Mo.
Barber-Greene Co., Aurora, Ill.
BARTLETT, C. O. & SNOW CO., Cleveland, Ohio...*p. 367*
*CALDWELL, H. W. & SON CO., 17th St. & Western Ave., Chicago, Ill...*p. 370*
Chicago Automatic Conveyor Co., 11 So. La Salle St., Chicago, Ill.
CONVEYING WEIGHER CO., 90 West St., New York, N. Y...*p. 371*
DODGE SALES & ENGINEERING CO., Mishawaka, Ind...*pp. 42, 43, 326, 327, 328, 329*
Dow Co (Inc.), Louisville, Ky.
Excavating & Screening Machinery Co., 698 Raymond Ave., St. Paul, Minn.
Haslett Spiral Chute Co., 510-512 N. 61st St., Philadelphia, Pa.

Digitized by Google

JEFFREY MFG. CO., 904 N. 4th St., Columbus, Ohio...*p. 376, 377*
*JONES, W. A. FOUNDRY & MACHINE CO., 4415 West Roosevelt Road, Chicago, Ill. ..*pp. 312, 313, 314, 315*
LAMSON CO., 100 Boyleston St., Boston, Mass...*pp. 378, 379*
Meese & Gottfried Co., 660 Mission St., San Francisco, Cal.
Olson, Samuel & Co., 2418-22 Bloomingdale Ave., Chicago, Ill.
Robbins Engineering Co., Old Colony Bldg., Chicago, Ill.
ROBINS CONVEYING BELT CO., Park Row Bldg., New York, N. Y...*p. 373*
Specialty Engineering Co., Allegheny & Trenton Aves., Philadelphia, Pa.
Standard Carrier Co., 112 E. 41st St., New York, N. Y.
STANDARD CONVEYOR CO., North St. Paul, Minn...*p. 380*
STANDARD SAND & MACHINE CO., 5151 St. Clair Ave., Cleveland, Ohio...*p. 635*
Stearns Conveyor Co., Cleveland, Ohio.
Stephens-Adamson Mfg. Co., Aurora, Ill.
STURTEVANT MILL CO., Harrison Sq., Boston 22, Mass...*pp. 600, 601*
WELLER MFG. CO., 1820-1856 N. Kostner Ave., Chicago, Ill...*p 381*

—Brick
STANDARD CONVEYOR CO., North St. Paul, Minn...*p. 380*

—Bucket, Pan or Apron
American Manufacturing & Engineering Co. (''Peerless''). Goshen, Ind.
BARLETT, C. O. & SNOW CO., Cleveland, Ohio...*p. 367*
*CALDWELL, H. W. & SON CO., 17th St. & Western Ave., Chicago, Ill...*p. 370*
Chicago Automatic Conveyor Co., 11 So. La Salle St., Chicago, Ill.
DODGE SALES & ENGINEERING CO., Mishawaka, Ind...*pp. 42, 43, 326, 327, 328, 329*
Dow Co. (Inc.), Louisville, Ky.
*GIFFORD-WOOD CO., Hudson, N. Y...*p. 372*
*HENDRICK MFG CO., Carbondale, Pa...*p. 653*
Haslett Spiral Chute Co., 510-512 N. 61st St., Philadelphia, Pa.
HUNT, C. W. CO. (Inc.), West New Brighton, Staten Island, N. Y...*pp. 374, 375*
JEFFREY MFG. CO., 904 N. 4th St., Columbus, Ohio...*pp. 376, 377*
LAMSON CO., 100 Boyleston St., Boston, Mass...*pp. 378, 379*
Roberston, Wm. & Co., 20 W. Jackson Blvd., Chicago, Ill.
STANDARD SAND & MACHINE CO., 5151 St. Clair Ave., Cleveland, Ohio...*p. 635*
Stearns Conveyor Co., Cleveland, Ohio
Stephens-Adamson Mfg. Co., Aurora, Ill.
STURTEVANT MILL CO., Harrison Sq., Boston 22, Mass...*pp. 600, 601*
WELLER MFG. CO., 1820-1856 N. Kostner Ave., Chicago, Ill...*p 381*

—Cable
Fairmont Mining Machinery Co, Fairmont, W. Va.
JEFFREY MFG. CO., 904 N. 4th St., Columbus, Ohio...*pp. 376, 377*

—Continuous Molding
STANDARD SAND & MACHINE CO., 5151 St. Clair Ave., Cleveland, Ohio...*p. 635*

—Gravity (Roller)
Alvey-Ferguson Co., 75 North Ave., Oakley, Cincinnati, O.
Alvey Mfg. Co., 3201 S. Broadway, St. Louis, Mo.
Dow Co. (Inc.), Louisville, Ky
Haslet Spiral Chute Co., Philadelphia, Pa.
LAMSON CO., 100 Boylston St., Boston, Mass...*pp. 378, 379*
Lowerator Co., (Inc.), 110 West 40th St., New York, N. Y.
Rownson, Drew & Clydesdale (Inc.), 30 Wall St., New York, N. Y.
Standard Carrier Co., 112 E. 41st St., New York
STANDARD CONVEYOR CO., North St. Paul, Minn...*p. 380*

—Lumber
JEFFREY MFG. CO., 904 N. 4th St., Columbus, Ohio...*pp. 376, 377*
STANDARD CONVEYOR CO., North St. Paul, Minn...*p. 380*
WELLER MFG. CO., 1820-1856 N. Kostner Ave., Chicago, Ill...*p. 381*

—Portable
Barber-Greene Co., Aurora, Ill.
Dow Co. (Inc.), Louisville, Ky.
JEFFREY MFG. CO., 904 N. 4th St., Columbus, Ohio...*pp. 376, 377*
LAMSON CO., 100 Boylston St., Boston, Mass...*pp. 378, 379*
McKinney-Harrington Co., Marquette St., North Chicago, Ill.
Portable Machinery Co., Passaic, N. J.
Robbins Engineering Co., Old Colony Bldg., Chicago, Ill.
STURTEVANT MILL CO., Harrison Sq., Boston 22, Mass...*pp. 600, 601*

—Ribbon Scroll
AMERICAN TOOL & MACHINE CO., Boston 9, Mass...*p. 614*

—Sand and Gravel
Universal Conveyor Co., 628 J. M. S. Bldg., So. Bend, Ind.

—Scraper
*BEAUMONT, R. H. CO., 340 Arch St., Philadelphia, Pa...*pp. 368, 369*
JEFFREY MFG. CO., 904 N. 4th St., Columbus, Ohio...*pp. 376, 377*
STANDARD SAND & MACHINE CO., 5151 St. Clair Ave., Cleveland, Ohio...*p. 635*
WELLER MFG. CO., 1820- 1856 N. Kostner Ave., Chicago, Ill.

—Screw
BARTLETT, C. O. & SNOW CO., Cleveland, Ohio...*p. 367*
*CALDWELL, H. W. & SON CO, 17th St. & Western Ave., Chicago, Ill...*p. 370*
DODGE SALES & ENGINEERING CO., Mishawaka, Ind...*pp. 42, 43, 326, 327, 328, 329*
JEFFREY MFG. CO., 904 N. 4th St., Columbus, Ohio...*pp. 376, 377*
Moore, George W. Co., 2144 Fulton St., Chicago, Ill.
*PANGBORN CORP'N, P. O. Box 859, Hagerstown, Md...*pp. 636, 637*
STURTEVANT MILL CO., Harrison Sq., Boston 22, Mass...*pp. 600, 601*
WELLER MFG. CO., 1820-1856 N. Kostner Ave., Chicago, Ill...*p. 381*

—Sectional
JEFFREY MFG. CO., 904 N. 4th St., Columbus, Ohio...*pp. 376, 377*
WELLER MFG. CO., 1820- 1856 N. Kostner Ave., Chicago, Ill...*p 381*

—Selective Delivery
Standard Carrier Co., 112 E. 41st St., New York, N. Y.

—Slat
STANDARD CONVEYOR CO., North St. Paul, Minn...*p. 380*
WELLER MFG. CO., 1820-1856 N. Kostner Ave., Chicago, Ill...*p. 381*

—Spiral
(See Chutes, Gravity, Spiral)

Co

Digitized by Google

—Steam Jet
Conveyors Corporation of America, 826 W Madison St., Chicago, Ill.
FREDERICK ENGINEERING CO., Frederick, Md...*p. 116*
Girtanner Engineering Corp., 1400 Broadway, New York, N. Y.
Parson Manufacturing Co., P. O. Box 212, Elizabeth, N. J.
United Conveyor Corporation, 1500 Old Colony Bldg., Chicago, Ill.
Vacuum Ash & Soot Conveyor Co., Wilson & Hyatt Ave., Newark, N. J.

—Tray (Automatic)
*CALDWELL, H. W. & SON CO., 17th & Western Aves., Chicago, Ill...*p. 370*
JEFFREY MFG. CO., 904 N. 4th St., Columbus, Ohio...*pp. 376, 377*
LAMSON CO., 100 Boylston St., Boston, Mass...*pp. 378, 379*
STANDARD CONVEYOR CO., North St. Paul, Minn...*p. 380*

COOLERS

—Brine
*DE LA VERGNE MACHINE CO., 1123 E.E 138th St., New York, N. Y...*p. 40*
NATIONAL PIPE BENDING CO., New Haven, Conn...*pp. 150, 151*
*VILTER MFG. CO., 1194-1196 Clinton St., Milwaukee, Wis...*pp. 16, 17*
*VOGT, HENRY MACHINE CO., Louisville, Ky...*pp. 632, 633*
Wittenmeier Machinery Co., 852 N. Spaulding Ave., Chicago, Ill.
YORK MFG. CO., York, Pa...*p. 631*

—Oil
Alberger Heater Co., 287 Chicago St., Buffalo, N. Y.
*BRAUN, C. F. & CO., San Francisco, Cal...*pp. 156, 157*
*NATIONAL PIPE BENDING CO. (''National''), New Haven, Conn...*pp. 150, 151*
*SCHUTTE & KOERTING CO., 1184 Thompson St., Philadelphia, Pa...*p. 159*

COOLING PONDS
Binks Spray Equipment Co., 8114-26 Carroll Ave., Chicago, Ill.
*COOLING TOWER CO. (Inc.), 15 John St., New York, N. Y...*p. 165*
*DE LA VERGNE MACHINE CO., 1123 E. 138th St., New York, N Y...*p. 40*
*SPRAY ENGINEERING CO. (''Spraco''), 60 High Street, Boston, Mass...*pp. 166, 167*

COOLING TOWERS
Bauer, Ferd. Engineering & Contracting Co., 4181-37 Meramac St., St. Louis, Mo.
*BRAUN, C. F. & CO., San Francisco, Cal. *pp. 156, 157*
Burhorn, Edwin Co. (''Burhorn''), 71 Wall St., New York, N. Y.
*COOLING TOWER CO. (Inc.), 15 John St., New York, N. Y...*p. 165*
Hart, Franklin B. Jr. Company (''Hart''), 50 Church St., New York, N. Y.
Penna. Cooling Tower Co., Highland Bldg., Pittsburgh, Pa.
Ruemmeli-Dawley Mfg. Co., 3900 Chouteau Ave., St. Louis, Mo.
Seymour, J. M. Jr., 51-53 Lawrence St., Newark, N. J.
Stocker, George J., St. Louis, Mo.
*WHEELER CONDENSER & ENGINEERING CO., Carteret, N. J...*p. 162*
*WHEELER, C. H. MFG CO., Sedgley & Lehigh Aves., Philadelphia, Pa...*p. 163*
Zellweger, J. & Sons, Adelaide Ave., St. Louis, Mo.

COOPERS' MACHINERY
Holmes, E. & B. Machinery Co., 58 Chicago St., Buffalo, N. Y.
Strait, H. N. Mfg. Co., Kansas City, Mo.

COPING MACHINES
Ham, L. M. Co., 150 Portland St., Boston, Mass.
Wickes Bros., Saginaw, Mich.

COPPER

—Drawn
*ROEBLING'S, JOHN A. SONS CO., Trenton, N. J...*p. 409*

—Electrolytic
United States Smelting Co. (Inc.), 120 Broadway, New York.

—Sheet
AMERICAN BRASS CO., Waterbury, Conn. *p. 414*
Hungerford, U. T. Brass & Copper Co., 80 Lafayette St., New York, N. Y.
New Haven Copper Co., Seymour, Conn.
Taunton-New Bedford Copper Co., Taunton, Mass.

COPPER CONVERTING MACHINERY
*ALLIS-CHALMERS MFG. CO., Milwaukee, Wis...*pp. 28, 29*
*WORTHINGTON PUMP & MACHINERY CORP'N, 115 Broadway, New York, N. Y. *pp. 44, 45, 46, 47*

COPPER SCRAPING MACHINES
POOLE ENGINEERING & MACHINE CO., Woodberry, Baltimore, Md...*pp. 316, 317*

COPPER WIRES AND CABLES
(See Wire and Cables, Electrical)

COPPER WORK
*BADGER, E. B. & SONS CO., 75 Pitts Street, Boston, Mass...*p. 164*
Furman-Fisher Corp'n, 30 Church St., New York City.
Harris, Arthur & Co., 212 Curtis St., Chicago, Ill.
KOVEN, L. O. & BROTHER, 154 Ogden Ave., Jersey City, N. J...*p. 605*
Lawrence, L. & Co., 290 Halsey St., Newark, N. J.
Philadelphia Coppersmithing Co., 22-226 N. Front St., Philadelphia, Pa.

CORE MAKING MACHINES
Grimes Molding Machine Co., 5738 Hastings St., Detroit, Mich.
International Molding Machine Co., 2608-2624 W. Sixteenth St., Chicago, Ill.

CORE WIRE STRAIGHTENERS
*WORTHINGTON PUMP & MACHINERY CORP'N, 115 Broadway, New York, N. Y. *pp. 44, 45, 46, 47*

CORK BOARD
Armstrong Cork & Insulation Co., 122-24th St., Pittsburgh, Pa.

CORKING MACHINES
Ermold, Edward Co., 652 Hudson St., New York, N. Y.

CORRUGATING MACHINERY
Knowlton, M. D. Co., 29 Elizabeth St., Rochester, N. Y.
Robinson, J. M. Mfg. Co., Cincinnati, Ohio.
Streine Tool & Mfg. Co., New Bremen, O.

COTTON GINNING MACHINES
Liddell Co., Charlotte, N. C.
Lummus Cotton Gin Scales Co., Dallas, Texas
Murray Co., Dallas, Tex.

COTTON MANUFACTURING MACHINERY
Carver Cotton Gin Co., East Bridgewater, Mass.
Curtis & Marble Machine Co., 78 Cambridge St., Worcester, Mass.
Saco-Lowell Shops, 77 Franklin St., Boston, Mass.
Whitin Machine Works, Whitinville, Mass.

COUNTERBORES
Advance Tool Co., Canal & Jackson Sts., Cincinnati, Ohio.

Digitized by Google

CLEVELAND TWIST DRILL CO., Cleveland, Ohio...*p. 502*
Davidson Tool Mfg. Corp'n, 120-124 Maiden Lane, New York, N. Y.
Gairing Tool Co. (Inc.), 9 West Woodbridge St., Detroit, Mich.
Hall Mfg. Co., Abington, Mass.
NATIONAL TOOL CO. (''National-Cleveland''), Cleveland, Ohio...*p. 504*
Production Tool Co. of America, 6474 Le Grande St., Detroit, Mich.

COUNTERS
BROWN INSTRUMENT CO. (''Brown''), Philadelphia, Pa...*p. 292*
Durant Mfg. Co., 655 Buffum St., Milwaukee, Wis.
International Register Co., 15 S. Throop St., Chicago, Ill.
Redington, F. B. Co., 114 S. Sangamon St., Chicago, Ill.

—Automatic
Root, C. J. Co., Bristol, Conn.

—Lineal Measure
BROWN INSTRUMENT CO. (''Brown''), Philadelphia, Pa...*p. 292*
Durant Mfg. Co., 655 Buffum St, Milwaukee, Wis.

—Revolution
AMERICAN STEAM GAUGE & VALVE MFG. CO., Boston, Mass...*pp. 200, 201*
Ashcroft Mfg. Co., 191 W. 40th St., New York.
*BRISTOL CO., Waterbury, Conn...*p. 291*
BROWN INSTRUMENT CO. (''Brown''), Philadelphia, Pa...*p. 292*
*CROSBY STEAM GAUGE & VALVE CO., 40 Central St., Boston, Mass...*pp. 202, 208*
Durant Mfg. Co., 655 Buffum St., Milwaukee, Wis.
Durbrow & Hearne, 12 Wooster St., New York, N. Y.
*FOXBORO CO. (Inc.), Foxboro, Mass...*p. 293*
Hart, R. A. Mfg. Co. Battle Creek, Mich.
LONERGAN, J. E. CO., 211-2115 Race St, Philadelphia, Pa...*pp. 203, 289*
National Gauge Co., 300 Pacific St., Brooklyn, N. Y.
Root, C. J. Co., Bristol, Conn.
*SCHAEFFER & BUDENBERG MFG. CO., Brooklyn, N. Y...*p 295*
Veeder Mfg. Co., 20 Sargeant St., Hartford, Conn.

COUNTERSHAFTS
AMERICAN TOOL & MACHINE CO., Boston 9, Mass...*p. 614*
*BUILDERS IRON FOUNDRY (''Universal-Pull''), Providence, R. I...*p. 277*
*CALDWELL, H. W. & SON CO., 17th St., & Western Ave, Chicago, Ill...*p. 370*
Clizbe Bros. Mfg. Co., Plymouth, Ind.
DODGE SALES & ENGINEERING CO., Mishawaka, Ind...*pp. 42, 43, 326, 327, 328, 329*
*FALLS CLUTCH & MACHINERY CO. Cuyahoga Falls, Ohio...*p. 330*
*HILL CLUTCH CO., Cleveland, Ohio...*p. 331*
*JONES, W. A. FOUNDRY & MACHINE CO., 4415 West Roosevelt Road, Chicago, Ill. ..*pp. 312, 313, 314, 315*
Partridge, E. O., 2047-2049 W. Lake St., Chicago, Ill.
WELLER MFG. CO., 1820-1856 N. Kostner Ave., Chicago, Ill...*p. 381*
*WOOD'S, T. B. SONS., CO., Chambersburg, Pa...*pp. 334, 335*

COUNTERSINKS
CLEVELAND TWIST DRILL CO., Cleveland, Ohio...*p. 502*
Maddaus Tool Corp'n., 90 West St., New York, N. Y.
Production Tool Co. of America, 6474 Le Grande St., Detroit, Mich.
Ypsilanti Twist Drill Co., 15-23 E. Cross St., Ypsilanti, Mich.

COUPLINGS

—Compression
*BROWN, A. & F. CO., 79 Barclay St., New York, N. Y...*p. 303*
DODGE SALES & ENGINEERING CO. (''Shaw & Dodge''), Mishawaka, Ind...*pp. 42, 43, 326, 327, 328, 329*
DOLE VALVE CO., 1923-33 Carroll Ave., Chicago, Ill. *p. 226*
FAIRBANKS-MORSE & CO., 900 S. Wabash Ave., Chicago, Ill...*p. 41*
Imperial Brass Mfg. Co., 1200 W. Harrison St., Chicago, Ill.
Strong, Homer & Co., Inc., 301-307 State St., Rochester, N. Y.
WELLER MFG. CO., 1820-1856 N. Kostner Ave., Chicago, Ill...*p. 381*

—Conduit
American Tube & Pipe Bending Co., 880 East 72nd St., Cleveland, Ohio.

—Flexible (Shaft)
Ajax Flexible Coupling Co., Westfield, N. Y.
*ALLIS-CHALMERS MFG. CO., Milwaukee, Wis...*pp. 28, 29*
Bartlett-Hayward Co., Baltimore, Md.
Bond, Charles Co., 617-619 Arch St., Philadelphia, Pa.
*BROWN, A. & F. CO., 79 Barclay St, New York, N. Y...*p. 303*
Bruce-MacBeth Engine Co., Cleveland, Ohio.
*CALDWELL, H. W. & SON CO., 17th St. & Western Ave., Chicago, Ill...*p 370*
Columbian Bronze Corp'n, 50 Church St., New York, N. Y.
Cooper Flexible Transmission Co. (Inc.), 18th St. & 8th Ave., Brooklyn, N. Y.
Dexter, I. H. Co., 183 Greenwich Ave., Goshen, N. Y.
DODGE SALES & ENGINEERING CO., Mishawaka, Ind...*pp. 42, 43, 326, 327, 328, 329*
FALK CORPORATION, Milwaukee, Wis. *pp. 304, 305*
*FALLS CLUTCH & MACHINERY CO., Cuyahoga Falls, Ohio...*p. 330*
*FAWCUS MACHINE CO., 2818 Smallman St., Pittsburgh, Pa...*p. 307*
*GENERAL ELECTRIC CO., Schenectady, N. Y...*pp. 18, 19, 20, 21*
HOOVEN, OWENS, RENSCHLER CO., Hamilton, Ohio...*p. 10*
*JAMES, D. O. MFG. CO., 1114-24 W. Monroe St., Chicago, Ill...*pp. 310, 311*
*JONES, W. A. FOUNDRY & MACHINE CO. 4415 West Roosevelt Road, Chicago, Ill. *pp. 312, 313, 314, 315*
Karge Baker Corp'n (''Karge''), Phoenix, N. Y.
Meriam Co., 8405 Detroit Ave., Cleveland, O.
Nuttall, R. D. Co., Pittsburgh, Pa.
Smith & Serrell (''Francke''), 41 Central Ave., Newark, N. J.
*WESTINGHOUSE ELECTRIC & MFG. CO., East Pittsburgh, Pa...*pp. 160, 161*
*WOOD'S, T. B. SONS CO. (''Universal Giant''), Chambersburg, Pa...*pp. 334, 335*

—Friction Clutch
(See Clutches, Friction)

—Pipe
Byers, A. M. Co., Pittsburgh, Pa.
*CRANE CO., 836 S. Michigan Ave., Chicago, Ill...*pp. 170, 171, 172, 173*
Dart, E. M. Mfg. Co., 134 Thurbers Ave., Providence, R. I.
HOPE ENGINEERING & SUPPLY CO. (''Hammon''), Mt. Vernon, O...*p. 49*

Co

Digitized by Google

Jefferson Union Co., Lexington, Mass.
KELLY & JONES CO., Greensburg, Pa...*pp. 182, 183*
*LUNKENHEIMER CO., Cincinnati, Ohio. *pp. 184, 185, 186, 187, 188, 189*
MALLEABLE IRON FITTINGS CO., Branford, Conn...*p. 236*
New Haven Screw Co., 191-193 Foster St., New Haven, Conn.
*PITTSBURGH VALVE, FOUNDRY & CONSTRUCTION CO. ("Atwood"), P. O. Box No. 1016, Pittsburgh, Pa...*pp. 192, 193*

—Shaft
*ALLIS-CHALMERS MFG. CO., Wilwaukee, Wis...*pp. 28, 29*
AMERICAN TOOL & MACHINE CO., Boston, Mass...*p. 641*
Bond, Charles Co., 617-619 Arch St., Philadelphia, Pa.
Bond Foundry & Machine Co. ("Spiro"), Manheim, Pa.
*BROWN, A. & F. CO., 79 Barclay St., New York, N. Y...*p. 303*
*CALDWELL, H. W. & SON CO., 17th St. & Western Ave., Chicago, Ill...*p. 370*
*CALDWELL, W. E. CO., 340 E. Brandeis St. Louisville, Ky...*p. 323*
CHICAGO PULLEY & SHAFTING CO., 30 So Clinton St., Chicago, Ill...*pp. 324, 325*
Cumberland Steel Co., Cumberland, Md.
Dexter, I. H. Co. (Inc.), 183 Greenwich Ave., Goshen, N. Y.
DODGE SALES & ENGINEERING CO., Mishawaka, Ind...*pp. 42, 43, 326, 327, 328, 329*
FAIRBANKS-MORSE & CO., 900 S. Wabash Ave., Chicago, Ill...*p. 41*
*FALLS CLUTCH & MACHINERY CO., Cuyahoga Falls, Ohio...*p. 330*
*HILL CLUTCH CO., Cleveland, Ohio...*p. 331*
*JONES, W. A. FOUNDRY & MACHINE CO., 4415 West Roosevelt Road, Chicago, Ill...*pp. 312, 313, 314, 315*
*MEDART PATENT PULLEY CO., St. Louis, Mo...*p. 333*
Nicholson, W. H. & Co., 12 Oregon St., Wilkes-Barre, Pa.
*ROYERSFORD FOUNDRY & MACHINE CO. (Inc.), 52 N. 5th St., Philadelphia, Pa...*pp. 346, 347*
Safety First Manufacturing Co. ("Bull Dog"), Alexandria, Va
Smith & Serrell ("Pintite"), 41 Central Ave., Newark, N. J.
Stuart, R. J. & T. H. Foundry & Machine Works, New Hamburg, N. Y.
WELLER MFG. CO, 1820-1856 N. Kostner Ave., Chicago, Ill...*p. 381*
*WOOD'S T. B. SONS CO., Chambersburg, Pa...*pp. 334, 335*

—Union
(See Union)

—Universal Joint
*BROWN, A. & F. CO., 79 Barclay St., New York, N. Y...*p. 303*
*CALDWELL, H. W. & SON CO., 17th St. & Western Ave., Chicago, Ill...*p. 370*
*CALDWELL, W. E. CO., 350 E. Brandeis St., Louisville, Ky...*p. 323*
DODGE SALES & ENGINEERING CO., Mishawaka, Ind...*pp. 326, 327, 328, 329, 42, 43*
*MEDART PATENT PULLEY CO., St. Louis, Mo...*p. 333*
WELLER MFG. CO., 1820-1856 N. Kostner Ave., Chicago, Ill...*p. 381*
*WOOD'S, T. B. SONS CO., Chambersburg, Pa...*pp. 334, 335*

COVERINGS

—Boiler Blowoff
Woolson, O. C. Son, 39 Cortlandt St., New York, N. Y.

—Boiler Setting
Excello Mfg. Co. ("Evertite"), Cleveland, Ohio.
*KING REFRACTORIES CO., 1709 Niagara St., Buffalo, N. Y...*p. 137*

—Brine Pipe
Acme Asbestos Covering & Supply Co., 1802 Fulton St., Chicago, Ill.

—Magnesia
Acme Asbestos Covering & Supply Co., 1802 Fulton St., Chicago, Ill.
Illinois Fire Proof Covering Co. (Inc.), 216 W. Kinzie St., Chicago, Ill.
*JOHNS-MANVILLE (Inc.), New York, N. Y...*p. 244*
Keasbey, Robert A., Co., 445 West St, New York, N. Y.
*MAGNESIA ASSOCIATION OF AMERICA, Bulletin Bldg., Philadelphia, Pa...*p. 245*
Nightingale & Childs Co., 205 Congress St., Boston, Mass.

—Pipe and Tank
Armstrong Cork & Insulation Co., 122-24th St., Pittsburgh, Pa.
Banner Rock Products Co. ("Rock Wool Quilt"), Alexandria, Ind.
Central Asbestos & Magnesia Co., 214-216 W. Grand Ave., Chicago, Ill.
Illinois Fire Proof Covering Co. (Inc.), 216 W. Kinzie St., Chicago, Ill.
Insulating Products Co., 1601 Fulford St., Kalamazoo, Mich.
*JOHNS-MANVILLE (Inc.), New York, N. Y...*p. 244*
*KING REFRACTORIES CO. (Inc.) ("Flame Brand"), 1709 Niagara St., Buffalo, N. Y. *p. 137*
Mikesell Brothers Co., 156 N. La Salle St., Chicago, Ill.

—Pulley
Peerless Belting Co., Gardenville Station, Buffalo, N. Y.
Shackley, W. T. & Son, 49 High St., Boston, Mass.

—Steam Pipe
Acme Asbestos Covering & Supply Co., 1802 Fulton St., Chicago, Ill.
AMERICAN DISTRICT STEAM CO., North Tonawanda, N. Y...*p. 248*
Aycock, R. V. Co., 1702 Grand Ave., Kansas City, Mo.
CAREY, PHILIP CO., Cincinnati, Ohio...*p. 245*
EHRET MAGNESIA MFG. CO., Valley Forge, Pa...*p. 245*
Fibre Cell Asbestos Mfg. Co., 407-409 S. Clinton St., Chicago, Ill.
FRANKLIN MFG. CO., Franklin, Pa...*p. 245*
Illinois Fire Proof Covering Co. (Inc.), 216 W. Kinzie St., Chicago, Ill.
*JOHNS-MANVILLE (Inc.), New York, N. Y. *p. 244*
KEASBEY & MATTISON CO., Ambler, Pa. *p. 245*
Keasbey, Robert A. Co., 445 West St., New York, N. Y.
*KING REFRACTORIES CO. (Inc.) ("Flame Brand"), 1709 Niagara St., Buffalo, N. Y. *p. 137*
*MAGNESIA ASSOCIATION OF AMERICA, Bulletin Bldg., Philadelphia, Pa...*p. 245*
National Asbestos Mfg. Co., 153-193 Henderson St., Jersey City, N. J.
Nightingale & Childs Co., 205 Congress St., Boston, Mass.
Norristown Magnesia & Asbestos Co., Norristown, Pa.

Digitized by Google

Ric-Wil Co., 522 Guardian Bldg., Cleveland, Ohio.
Standard Asbestos Mfg. Co., Chicago, Ill.
Wyckoff, A. & Son Co., 100 Home St., Elmira, N. Y.

CRANES

—Auto Truck
Bay City Foundry & Machine Co., 26th & Water Sts., Bay City, Mich.
Manley Mfg. Co., York, Pa.

—Electric Traveling
Abell-Howe Co., 1406 S. Michigan Ave., Chicago, Ill.
Alliance Machine Co., Alliance, Ohio
Armington Engineering Co., Euclid, Ohio
Barber-Foster Engineering Co., 318 Stuyvesant Bldg., Cleveland, Ohio
Bedford Foundry & Machine Co., ("Bedford"), Bedford, Ind.
BOX, ALFRED & CO. (Inc.), Philadelphia, Pa...*p. 394*
Browning, Victor R. Engrg. Co., 17701 Lake Shore Blvd., Cleveland, Ohio
Cameron Engineering Co., East Stroudsburg Pa.
Chesapeake Iron Works, Baltimore, Md.
Cleveland Crane & Engineering Co., Wickliffe, Ohio
Detroit Hoist & Machine Co., 8201 Morrow St,. Detroit, Mich.
Erie Steel Construction Co., Box 15, S. Erie Station, Erie, Pa.
Euclid Crane & Hoist Co., Euclid, Ohio
Gilbert-Grant Co. (Inc.), Grand Central Terminal, New York, N. Y.
Granger, A. D. Co., 15 Park Row, New York, N. Y.
Hay's Sam'l W. Sons, 1406 Keenan Bldg., Pittsburgh, Pa.
Kinney, J. N., 30 Church St., New York
Lane Mfg. Co., Montpelier, Vt.
Manning, Maxwell & Moore (Inc.), 119 W. 40th St., New York, N. Y.
MARIS BROS. (INC.), 5546 Gray's Ave., Philadelphia, Pa...*p. 395*
Milwaukee Electric Crane & Mfg. Co., 60th & Greenfield Ave., Milwaukee, Wis.
Morgan Engineering Co., Alliance, Ohio
MORRIS, HERBERT (INC.), 1-15 Lawrence Place, Buffalo, N. Y...*p. 402*
NEW JERSEY FOUNDRY & MACHINE CO., 90 West St., New York, N. Y...*p. 396*
NILES-BEMENT-POND CO., 111 Broadway, New York, N. Y...*p. 470*
*NORTHERN ENGINEERING WORKS, Detroit, Mich...*p. 397*
OHIO LOCOMOTIVE CRANE CO., Grace St., Bucyrus, Ohio...*p. 391*
*PAWLING & HARNISCHFEGER CO., ("P. & H."), Milwaukee, Wis...*p. 398*
Pittsburgh Crane & Equipment Co., Pittsburgh, Pa.
*READING CHAIN & BLOCK CORP'N. ("Reading"), Reading, Pa...*p. 403*
Ricker Mfg. Co., Rochester, N. Y.
Roeper Crane & Hoist Works, 1722 38 No 10th St., Reading, Pa.
San Francisco Engineering Co., 322-324 6th St., San Francisco, Cal.
Scully-Jones Co., 2012 West 13th St., Chicago, Ill.
*SHEPARD ELECTRIC CRANE & HOIST CO., Montour Falls, N. Y...*pp. 400, 401*
Stamp, Charles E. & Co., Citizens Bldg., Cleveland, Ohio
Stamp Electric Hoist Co., 1500 17th St., San Francisco, Cal.
TOLEDO CRANE CO., 102 Sandusky St., Bucyrus, Ohio...*p. 399*
Vulcan Iron Works ("Vulcan"), 1849 Kearney St., San Francisco, Cal.
Whiting Corp'n, Harvey, Ill.

—Floor (Portable)
*BROWN HOISTING MACHINERY CO., Cleveland, Ohio...*p. 390*
Brown Portable Conveying Machinery Co., Chicago, Ill.
Canton Foundry & Machine Co., ("Canton") Canton, Ohio
La Fayette Engineering Co., La Fayette, Ind.
Manley Mfg. Co. ("Manley"), York, Pa.
MORRIS, HERBERT (Inc.), 1-15 Lawrence Place, Buffalo, N. Y...*p. 402*
Soper, George E. ("Hercules"), 154 W. Water St., Kankakee, Ill.

—Floor (Portable, Electric)
BAKER, R. & L. CO., Cleveland, O...*p. 382*

—Full Circle
TERRY MFG. CO., Grand Central Terminal, New York, N. Y...*p. 389*

—Furnace Charging
*PAWLING & HARNISCHFEGER CO. ("P. & H."), Milwaukee, Wis...*p. 398*

—Gantry
Alliance Machine Co., Alliance, Ohio
*BROWN HOISTING MACHINERY CO., Cleveland, Ohio...*p. 390*
Cleveland Crane & Engrg. Co., Wickliffe, O.
Erie Steel Construction Co., Box 15, E. Erie Station, Erie, Pa.
INDUSTRIAL WORKS, Bay City, Mich...*pp. 392, 393*
Kinney, N. J., 30 Church St., New York, N. Y.
Lakeside Bridge & Steel Co. ("Labride"), 404 Villard Ave., North Milwaukee, Wis.
MORRIS, HERBERT (Inc.), 1-15 Lawrence Place, Buffalo, N. Y...*p. 402*
NILES-BEMENT-POND CO., 111 Broadway, New York, N. Y...*p. 470*
*NORTHERN ENGINEERING WORKS, Detroit, Mich...*p. 397*
OHIO LOCOMOTIVE CRANE CO., Grace St., Bucyrus, Ohio...*p. 391*
Orton & Steinbrenner Co., Chicago, Ill.
*PAWLING & HARNISCHFEGER CO. ("P. & H."), Milwaukee, Wis...*p. 398*
TERRY MFG. CO., Grand Central Terminal, New York, N. Y...*p. 389*
TOLEDO CRANE CO., 102 Sandusky St., Bucyrus, Ohio...*p. 399*
United States Crane Co., 122 S. Michigan Ave., Chicago, Ill.

—Gasolene
INDUSTRIAL WORKS, Bay City, Mich...*pp. 392, 39*:

—Hand Power
Armington Engineering Co., Euclid, Ohio
BOX, ALFRED & CO. (Inc.), Philadelphia, Pa...*p. 394*
*BROWN HOISTING MACHINERY CO., Cleveland, Ohio...*p. 390*
Chisholm & Moore Mfg. Co., 5046 Lakeside Ave., Cleveland, Ohio
Curtis Pneumatic Machinery Co., St. Louis, Mo
Euclid Crane & Hoist Co., Euclid, Ohio
Gilbert-Grant Co. (Inc.), Grand Central Terminal, New York, N. Y.
MARIS BROS. (Inc.), 5546 Gray's Ave., Philadelphia, Pa...*p. 395*
Moore, Franklin Co., Winstead Conn.
MORRIS, HERBERT (Inc.), 1-15 Lawrence Pl., Buffalo, N. Y...*p. 402*
NEW JERSEY FOUNDRY & MACHINE CO., 90 West St., New York, N. Y...*p. 396*
NILES-BEMENT-POND CO., 111 Broadway, New York, N. Y...*p. 470*
*NORTHERN ENGINEERING WORKS, Detroit, Mich...*p. 397*
*PAWLING & HARNISCHFEGER CO. ("P. & H."), Milwaukee, Wis...*p. 398*
*READING CHAIN & BLOCK CORP'N ("Reading"), Reading, Pa...*p. 403*

Cr

Digitized by Google

Ricker Mfg. Co., Rochester, N. Y.
Roeper Crane & Hoist Works, 1722-38 N. 10th St., Reading, Pa.
Speidel, J. G., Reading, Pa.
Stamp, Charles E. & Co., Citizens Bldg., Cleveland, Ohio
Wright Mfg. Co., Lisbon, Ohio

—Hydraulic
WATSON-STILLMAN CO., 35 Church St., New York, N. Y...*p. 596*
WOOD, R. D. & CO., Philadelphia, Pa...*p. 597*

—Jib
BOX, ALFRED & CO. (Inc.), Philadelphia, Pa...*p. 394*
*BROWN HOISTING MACHINERY CO., Cleveland, Ohio..*p. 390*
Cameron Engineering Co., Stroudsburg, Pa.
Erie Steel Construction Co., Box 15, S. Erie Station, Erie, Pa.
Hay's, Sam'l W. Sons, 1406 Keenan Bldg., Pittsburgh, Pa.
INDUSTRIAL WORKS, Bay City, Mich...*pp. 392, 393*
MARIS BROS. (Inc.), 5546 Grays Ave., Philadelphia, Pa...*p. 395*
MORRIS, HERBERT (Inc.), 1-15 Lawrence Pl., Buffalo, N. Y...*p. 402*
NEW JERSEY FOUNDRY & MACHINE CO., 90 West St., New York, N. Y...*p. 396*
NILES-BEMENT-POND CO, 111 Broadway, New York, N. Y...*p. 470*
*NORTHERN ENGINEERING WORKS, Detroit, Mich...*p. 397*
*PAWLING & HARNISCHFEGER CO. ("P&H"), Milwaukee, Wis...*p. 398*
Parker, S. E., 3830 N. Kilbourn Ave., Chicago, Ill.
Pittsburgh Crane & Equipment Co., 19th P & R. R., Sharpsburg, Pa.
*SHEPARD ELECTRIC CRANE & HOIST CO., Montour Falls, N. Y...*pp. 400, 401, 442*
Speidel, J. G., Reading, Pa.

—Locomotive
AMERICAN HOIST & DERRICK CO., St. Paul, Minn...*p. 383*
*BROWN HOISTING MACHINERY CO., Cleveland, Ohio..*p. 390*
Browning Co., 16226 Waterloo Rd., Cleveland, Ohio
Browning, Victor R. Engineering Co., 17701 Lake Shore Blvd., Cleveland, Ohio
Buffalo Hoist & Derrick Co., 129 Erie St., Buffalo, N. Y
Byers, John F. Machine Co., Ravenna, Ohio
Carroll Foundry & Machine Co., Bucyrus, Ohio
Davenport Locomotive Works, Davenport, Iowa
Dravo Constructing Co., Engineering Works Dept., Pittsburgh, Pa.
Exeter Machine Works, Pittston, Pa.
FAIRBANKS, MORSE & CO., 900 S. Wabash Ave., Chicago, Ill...*p. 41*
Hanna Engineering Works, 1765 Elston Ave., Chicago, Ill.
INDUSTRIAL WORKS, Bay City, Mich...*pp. 392, 393*
Kinney, J. N., 30 Church St., New York, N. Y.
Link Belt Co., 39th St. & Stewart Ave., Chicago, Ill.
McMyler Interstate Co., Bedford, Ohio
Northwest Engineering Works ("Northwest"), Green Bay, Wis.
OHIO LOCOMOTIVE CRANE CO., Grace St., Bucyrus, Ohio..*p. 391*
Orton & Steinbrenner, 608 S. Dearborn St., Chicago, Ill.
Osgood Co., Marion, Ohio
TERRY MFG. CO., Grand Central Terminal, New York, N. Y...*p. 389*
Thew Shovel Co., Lorain, Ohio
United States Crane Co., 122 S. Michigan Ave., Chicago, Ill.

—Pillar
*BROWN HOISTING MACHINERY CO., Cleveland, Ohio..*p. 390*
INDUSTRIAL WORKS, Bay City, Mich...*pp. 392, 393*
*NORTHERN ENGINEERING WORKS, Detroit, Mich...*p. 397*
Speidel, J. G., Reading, Pa.

—Pneumatic
Detroit Hoist & Machine Co., 8201 Morrow St., Detroit, Mich.
MORRIS, HERBERT (Inc.), 1-15 Lawrence Pl., Buffalo, N. Y...*p. 402*
Stamp, Charles E. & Co., Citizens Bldg., Cleveland, Ohio

—Portable
Beatty Machine & Mfg. Co., Hammond, Ind.
*BROWN HOISTING MACHINERY CO. Cleveland, Ohio..*p. 390*
Franklin Portable Crane & Hoist Co., Franklin, Pa.
LaFayette Engineering Co., LaFayette, Ind.
Milton, S. G. & Son ("Champion"), Franklin, Pa.
MORRIS, HERBERT (Inc.), 1-15 Lawrence Pl., Buffalo, N. Y...*p. 402*

—Shipyard
Dravo Contracting Co., Engineering Works Dept., Pittsburgh, Pa.
McMyler Interstate Co., Bedford, Ohio
MORRIS, HERBERT (Inc.), 1-15 Lawrence Pl., Buffalo, N. Y...*p. 402*
TERRY MFG. CO., Grand Central Terminal, New York, N. Y...*p. 389*
United States Crane Co., 122 S. Michigan Ave., Chicago, Ill.

—Tractor
INDUSTRIAL WORKS, Bay City, Mich...*pp. 392, 393*

—Wharf
Heyl & Patterson (Inc.), 51 Water St., Pittsburgh, Pa.
INDUSTRIAL WORKS, Bay City, Mich...*pp. 392, 393*

—Wrecking
Carroll Foundry & Machine Co., Bucyrus, Ohio
INDUSTRIAL WORKS, Bay City, Mich...*pp. 392, 393*
OHIO LOCOMOTIVE CRANE CO., Grace St., Bucyrus, Ohio..*p. 391*

CRANK PIN RE-TURNING MACHINES
Sawyer-Weber Tod Mfg. Co., 350 So. Alameda St., Los Angeles, Cal.

CRANK PIN TURNING MACHINES
Rooksby, E. J. & Co., 1042 Ridge Ave., Philadelphia, Pa.
Underwood, H. B. Corp'n, 1025 Hamilton St., Philadelphia, Pa.

CRANKS, BALL
Cincinnati Ball Crank Co., Cincinnati, Ohio
WILLIAMS, J. H. & CO., 70 Richards St., Brooklyn, N. Y...*p. 517*

CRANKSHAFTS
Cleveland City Forge & Iron Co., 45th St. & Lakeside Ave., Cleveland, Ohio
Jersey Forging Works, 16th St. & Jersey Ave., Jersey City, N. J.
Leard, Wm. Co., 16th St. & 5th Ave., New Brighton, Pa.
Standard Gauge Steel Co., Beaver Falls, Pa.
Union Drop Forge Co., 358 W. Grand Ave., Chicago, Ill.
Union Switch & Signal Co., Swissvale, Pa.
VULCAN STEAM FORGING CO., 247 Rano St., Buffalo, N. Y...*p. 433*

Digitized by Google

WILLIAMS, J. H. & CO., 70 Richards St., Brooklyn, N. Y...*p. 517*

CROSS HEADS

*BARCO MFG. CO., Chicago, Ill...*p. 340*

CRUCIBLES

—Graphite

Dixon, Joseph Crucible Co., Jersey City, N. J.
McCullough-Dalzell Crucible Co., 36th St., Pittsburgh, Pa.
Seidel, R. B. (Inc.) ("Seidel"), 1822 Callowhill St., Philadelphia, Pa.
Woodison, E. J. Co., Detroit, Mich.

—Plumbago

McCullough-Dalzell Crucible Co., 36th St. & A. V. Ry., Pittsburgh, Pa.
Ross-Tacony Crucible Co., Tacony, Philadelphia, Pa.

CRUSHERS

—Clinker, Air-Cooled

Woolson's, O. C. Son, 39 Cortlandt St., New York, N. Y.

—Coal

Aero Pulverizer Co., 120 Broadway, New York, N. Y.
American Pulverizer Co., 18th & Austin Sts., St. Louis, Mo.
BARTLETT, C. O. & SNOW CO., Cleveland, Ohio..*p. 367*
*FULLER-LEHIGH CO., Fullerton, Pa...*p. 128*
Gruendler Patent Crusher & Pulverizer Co., 928 N. 1st St., St. Louis, Mo.
Hiller, Joseph L., 21 S. 12th St., Philadelphia, Pa.
HUNT, C. W. CO. (Inc.), West New Brighton, Staten Island, N. Y...*pp. 374, 375*
JEFFREY MFG. CO., 904 N. 4th St., Columbus, Ohio..*pp. 376, 377*
K-B Pulverizer Co. (Inc.), 92 Lafayette St., New York, N. Y.
Pennsylvania Crusher Co., 1324 Girard Bldg., Philadelphia, Pa.
Robbins Engineering Co., Old Colony Bldg., Chicago, Ill.
ROBINS CONVEYING BELT CO., Park Row Bldg., New York, N. Y...*p. 373*
Scottdale Machine & Mfg. Co., Scottdale, Pa.
*SMIDTH, F. L. & CO., 50 Church St., New York, N. Y...*p. 604*
Specialty Engineering Co., Allegheny & Trenton Aves., Philadelphia, Pa.
Stephenson-Adamson Mfg. Co., Aurora, Ill.
UNION ENGINEERING CO., Cleveland, Ohio. *p. 645*
WELLER MFG. CO., 1820-1856 N. Kostner Ave., Chicago, Ill...*p. 381*
WILLIAMS PATENT CRUSHER & PULVERIZER CO., St. Louis, Mo.—*pp. 602, 603*

—Hammer

BARTLETT, C. O. & SNOW CO., Cleveland, Ohio..*p. 367*
JEFFREY MFG. CO., 904 N. 4th St., Columbus, Ohio..*pp. 376, 377*
STURTEVANT MILL CO., Harrison Sq., Boston, 22, Mass...*pp. 600, 601*
WILLIAMS PATENT CRUSHER & PULVERIZER CO., St. Louis, Mo...*pp. 602, 603*

—Jaw

*ALLIS-CHALMERS MFG. CO., Milwaukee, Wis...*pp. 28, 29*
STURTEVANT MILL CO., Harrison Sq., Boston, 22, Mass...*pp. 600, 601*
WILLIAMS PATENT CRUSHER & PULVERIZER CO., St. Louis, Mo...*pp. 602, 603*
WORTHINGTON PUMP & MACHINE CORP'N, 115 Broadway, New York, N. Y. *pp. 44, 45, 46, 47

—Ore and Rock

*ALLIS-CHALMERS MFG. CO., Milwaukee, Wis...*pp. 28, 29*
BARTLETT, C. O. & SNOW CO., Cleveland, Ohio..*p. 367*
Buchanan, C. G. Co. (Inc.), 90 West St., New York, N Y.
Chalmers & Williams, Chicago Heights, Ill.
Farrel Foundry & Machine Co., Ansonia, Conn.
*FULLER-LEHIGH CO., Fullerton, Pa...*p. 128*
Goods Roads Machinery Co., Bulletin Bldg., Philadelphia, Pa.
JEFFREY MFG. CO., 904 N. 4th St., Columbus, Ohio..*pp. 376, 377*
K-B Pulverizer Co (Inc.), 92 Lafayette St., New York, N. Y.
Marathon Mill Machinery Works, 303 West University Ave., Champaign, Ill.
STURTEVANT MILL CO., Harrison Sq., Boston, 22, Mass...*pp. 600, 601*
Universal Road Machinery Co., Kingston, N. Y.
*WORTHINGTON PUMP & MACHINERY CORP'N, 115 Broadway, N. Y...*pp. 44, 45, 46, 47*

—Roll

*ALLIS-CHALMERS MFG. CO., Milwaukee, Wis...*pp. 28, 29*
BARTLETT, C. O. & SNOW CO., Cleveland, Ohio..*p. 367*
*FULLER-LEHIGH CO., Fullerton, Pa...*p. 128*
HUNT, C. W. CO. (Inc.), West New Brighton, Staten Island, N. Y..*pp. 374, 375*
JEFFREY MFG. CO., 904 N. 4th St., Columbus, Ohio..*pp. 376, 377*
McLanahan-Stone Machine Co., Hollidaysburg, Pa.
Pennsylvania Crusher Co., Stephen Girard Bldg., Philadelphia, Pa.
Standard Equipment Co., 185 Church St., New Haven, Conn.
Stephenson Co., Wellsville, Ohio
STURTEVANT MILL CO., Harrison Sq., Boston, 22, Mass...*pp. 600, 601*
*WORTHINGTON PUMP & MACHINERY CORP'N, 115 Broadway, New York, N. Y. *pp. 44, 45, 46, 47*

—Roll, Single

Pennsylvania Crusher Co., 1324 Stephen Girard Bldg., Philadelphia, Pa.

—Salt

STURTEVANT MILL CO., Harrison Sq., Boston, 22, Mass...*pp. 600, 601*
WILLCOX ENGINEERING CO., Saginaw, Mich...*pp. 272, 613*

—Slag

JEFFREY MFG. CO., 904 N. 4th St., Columbus, Ohio..*pp. 376, 377*

—Wood Pulp

Carthage Machine Co., Carthage, N. Y.
JEFFREY MFG. CO., 904 N. 4th St., Columbus, Ohio..*pp. 376, 377*
WILLIAMS PATENT CRUSHER & PULVERIZER CO., St. Louis, Mo...*pp. 602, 603*

CRUSHER PARTS

Lobdell Car Wheel Co., P. O. Box 965, Wilmington, Del.
American Manganese Steel Co., Chicago Heights, Ill.

CRUSHING AND GRINDING MACHINERY

*ALLIS-CHALMERS MFG. CO., Milwaukee, Wis...*pp. 28, 29*
BARTLETT, C. O. & SNOW CO., Cleveland, Ohio..*p. 367*
Bauer Bros. Co., Springfield, Ohio
CHAMBERS BROS. CO., Philadelphia, Pa...*p. 599*

Cr

Digitized by Google

*FULLER-LEHIGH CO., Fullerton, Pa...*p. 128*
JEFFREY MFG. CO., 904 N. 4th St., Columbus, Ohio..*pp. 376, 377*
Gruendler Patent Crusher & Pulverizer Co., 928 N. 1st St., St. Louis, Mo.
Lonewell-Henrici Co., Chelsea, Mass.
Pennsylvania Crusher Co., 1324 Stephen Girard Bldg., Philadelphia, Pa.
Phillips & McLaren Co., 24th & Smallman Sts., Pittsburgh, Pa.
Reliance Steel Casting Co., 28th & Smallman Sts., Pittsburgh, Pa.
*SMIDTH, F. L. & CO., 50 Church St., New York, N. Y...*p. 604*
Standard Equipment Co., 185 Church St., New Haven, Conn.
Stroud, E. H. & Co., 928-934 Fullerton Ave., Chicago, Ill.
STURTEVANT MILL CO., Harrison Sq., Boston, 22, Mass...*pp. 600, 601*
Traylor Engineering & Mfg. Co., Allentown, Pa.
WILLIAMS PATENT CRUSHER & PULVERIZER CO., St. Louis, Mo...*pp. 602, 603*
*WORTHINGTON PUMP & MACHINERY CORP'N, 115 Broadway, New York, N. Y. *pp. 44, 45, 46, 47*

—Sugar Cane

FULTON IRON WORKS CO., St. Louis, Mo. *p. 37*
Honolulu Iron Works Co., Honolulu, T. H.
*U. S. CAST IRON PIPE & FOUNDRY CO., Burlington, N. J...*pp. 232, 233*

CRYSTALLIZERS

—Salt

*WILLCOX ENGINEERING CO., Saginaw, Mich...*pp. 272, 613*

—Sugar

LEBANON BOILER WORKS (J. K. Petty & Co., Inc.), 6 S. 15th St., Philadelphia, Pa...*pp. 78, 79*
STEACY-SCHMIDT MFG. CO., York, Pa... *p. 612*
Turl Iron & Car Co. (Inc.), 50 Broad St., New York, N. Y.
*WALSH & WEIDNER BOILER CO., Chattanooga, Tenn...*p. 91*

CUPOLAS, FOUNDRY

Central Foundry Supply Co., P. O. Box 945, Columbus, Ohio
*NORTHERN ENGINEERING WORKS, Detroit, Mich...*p. 397*
Sly, W. W. Mfg. Co., Cleveland, Ohio

—Tilting

Ross, George A., 1951 W. Madison St., Chicago, Ill.

CUTTER HEADS (Woodworking)

Mattison Machine Works, Rockford, Ill.

CUTTERS

—Bar

Buffalo Forge Co., 490 Broadway, Buffalo, N. Y.
Lewthwaite, T. H. Machine Co., 411 E. 31st St., New York, N. Y.
McKenna Co., 1851 E. 38th St., Cleveland, Ohio
Madison Mfg. Co., Spring and Elton Sts., Muskegon, Mich.

—Boiler Tube

Faessler, J. Mfg. Co., Moberly, Mo.
*LANDIS MACHINE CO. (Inc.), Waynesboro, Pa ..*pp. 496, 497*
Redington, F. B. Co., 114 S. Sangamon St., Chicago, Ill
Salisbury Foundry & Machine Co., Salisbury, Md.
Union Machine Co., 183 University Ave., St. Paul, Minn.

—Bolt

*LANDIS MACHINE CO. (Inc.), Waynesboro, Pa...*pp. 496, 497*
Acme Machinery Co., 4533 St. Clair Ave., N. E., Cleveland, Ohio
Baird Pneumatic Tool Co., Rialto Bldg., Kansas City, Mo.
NILES-BEMONT-POND CO., 111 Broadway, New York, N. Y...*p. 470*

—Die Sinking

Tomkins-Johnson Co., Jackson, Mich.

—Die-Sinking Milling

Tomkins-Johnson Co., Jackson, Mich.

—Gauge Glass

LONERGAN, J. E. CO., 211-215 Race St., Philadelphia, Pa...*pp. 203, 289*

—Gear

*FELLOWS GEAR SHAPER CO., Springfied, Vt...*pp. 472, 473*
ILLINOIS TOOL WORKS, 154 E. Erie St., Chicago, Ill...*p. 503*
Michigan Tool Co., 404 E. Jefferson Ave., Detroit, Mich.

—Gear and Formed

Bridgeport Cutter Works (Inc.), 50 Reamer St., Bridgeport, Conn.
BROWN & SHARPE MFG. CO., Providence, R. I...*p. 477*
ILLINOIS TOOL WORKS, 154 E. Erie St., Chicago, Ill...*p. 503*
Michigan Tool Co., 404 E. Jefferson Ave., Detroit, Mich.
NATIONAL TOOL CO. (''National-Cleveland'', Cleveland, Ohio..*p. 504*
Shields Cutter Co., 18511 Euclide Ave., Cleveand, Ohio

—Inserted Tooth

NATIONAL TOOL CO. (''National-Cleveland''), Cleveland, Ohio..*p. 504*
Shields Cutter Co., 18511 Euclide Ave., Cleveland, Ohio

—Keyway

Fastfeed Drill & Tool Corp'n. (''Fastfeed''), Clinton & Oakwood Sts., Toledo, Ohio

—Milling

Advance Tool Co., Canal & Jackson Sts., Cincinnati, Ohio
Alvord Reamer & Tool Co., Millersburg, Pa.
American Machine Products Co., 18th & Howard Strs., Detroit, Mich.
BARBER-COLMAN CO., Rockford, Ill...*pp. 474, 475*
Becker Milling Machine Co., 53 Franklin St., Boston, Mass.
Bridgeport Cutter Wks. (Inc.), 50 Reamer St., Bridgeport, Conn.
BROWN & SHARPE MFG. CO., Providence, R. I...*p. 477*
Cowles Tool Co, 2086 W. 110th St., Cleveland, Ohio
Davidson Tool Mfg Corp'n, 120-124 Maiden Lane, New York, N. Y.
Detroit Reamer & Tool Co., 302 Congress St., East, Detroit, Mich.
Detroit Twist Drill Co., Cor. Fort and 14th St., Detroit, Mich.
Gale-Sawyer Co., 36 Oliver St., Boston, Mass.
Genesee Mfg. Co., Rochester, N. Y.
Goddard & Goddard Co., Detroit, Mich.
Goddard Tool Co., 351 W. Chicago Ave., Chicago, Ill.
Haynes Stellite Company, 30 East 42nd St., New York, N. Y.
ILLINOIS TOOL WORKS, 154 E. Erie St., Chicago, Ill...*p. 503*
INGERSOLL MILLING MACHINE CO., Rockford, Ill...*pp. 478, 479*
Lovejoy Tool Co. (Inc.), Springfield, Vt.
Mergenthaler Co., 116 Hollingsworth St., Baltimore, Md.
Michigan Tool Co., 404 E. Jefferson Ave., Detroit, Mich.

Digitized by Google

Morse Twist Drill & Machine Co., New Bedford, Mass.
NATIONAL TOOL CO. ("National-Cleveland"), Cleveland, Ohio...*p. 504*
National Twist Drill & Tool Co., Brush near Boulevard, Detroit, Mich.
Production Tool Co. of America, 6474 Le Grande St., Detroit, Mich.
Shields Cutter Co., 18511 Euclide Ave., Cleveland, Ohio
Smith, R. G. Tool & Mfg. Co., 315 Market St., Newark, N. J.
Standard Tool Co., 6900 Central Ave., Cleveland, Ohio
Union Twist Drill Co., Athol, Mass.
*WHITNEY MFG. CO. ("Whitney"), Hartford, Conn...*p. 495*
Winchester Repeating Arms Co., New Haven, Conn.

—Pipe
Fox Machine Co., 1807 W. Ganson St., Jackson, Mich.
*LANDIS MACHINE CO. (Inc.), Waynesboro, Pa...*pp. 496, 497*
NILES-BEMENT-POND CO., 111 Broadway, New York, N. Y...*p. 470*
Reed Mfg. Co., Erie, Pa
Saunders', D. Sons (Inc.), 21 Atherton St., Yonkers, N. Y.
Toledo Pipe Threading Machine Co. ("Toledo"), 1445 Summit St., Toledo, Ohio
Trimont Mfg. Co. ("Trimo"), Roxbury, Boston, Mass.

—Rod
Tucker, W. W. & C. F., 191 Franklin Ave., Hartford, Conn.

—Sheet Metal
Savage, W. J. Co. (Inc.), Knoxville, Tenn.

—Slitting, Gang
Tinker, F. & Sons Co., Butler St. at 57th, Arsenal Sta., Pittsburgh, Pa.

—Spruce
*BLISS, E. W. CO., Brooklyn, N. Y...*pp. 438, 439*
Tesmer Machine & Tool Co., 1425-45 Rivard St., Detroit, Mich.

CUTTING APPARATUS

—Electric
Electric Arc Cutting & Welding Co. ("Alternarc"), 152-158 Jelliff Ave., Newark, N. J.
QUASI-ARC WELDTRODE CO. (Inc.), 114 Hudson Ave., Peekskill, N. Y...*p. 538*
WILSON WELDER & METALS CO. (Inc.), 259 36th St., Brooklyn, N. Y...*p. 537*

—Oxy-Acetylene
BASTIAN-BLESSING CO. ("Rego"), 125 W. Austin Ave., Chicago, Ill...*p. 539*
Cox Brass Mfg. Co., Albany, N. Y.
ELECTROLABS CO., Pittsburgh, Pa...*p. 536*
Imperial Brass Mfg. Co. ("Imperial"), 1200 W. Harrison St., Chicago, Ill.
Metals Welding Co., 4400 Perkins Ave., Cleveland, Ohio
Safety Car Heating & Lighting Co. ("Pintsch"), New Haven, Conn.

—Oxy-Hydrogen
BASTIAN-BLESSING CO. ("Rego"), 125 W. Austin Ave., Chicago, Ill...*p. 539*
Burdett Mfg. Co., 309 St. Johns Court, Chicago, Ill.
ELECTROLABS CO., Pittsburgh, Pa...*p. 536*

CUTTING-OFF MACHINES

—Abrasive
Peter Brothers' Mfg. Co., Algonquin, Ill.

—Band Saw (Metals)
Metal Saw & Machine Co. (Inc.), 40 Napier St., Springfield, Mass.
Gilman & Son, Springfield, Vt.

—Cold Saw
Bardons & Oliver, 1133 Ninth St., Cleveland, Ohio
Cochrane-Bly Co., 15 St. James Place, Rochester, N. Y.
Earle Gear & Machine Co. ("Lea-Simplex"), 4709 Stenton Ave., Philadelphia, Pa.
Espen-Lucas Machine Works, Front St. & Girard Ave., Philadelphia, Pa.
Gorton, George Machine Co., Racine, Wis.
Ham, L. M. Co., 150 Portland St., Boston, Mass.
Higley Machine Co., South Norwalk, Conn.
Matson Machine Co., Concord, N. H.
Modern Machine Tool Co., 401 Water St., Jackson, Mich.
Newton Machine Tool Works (Inc.), 23rd & Vine Sts., Philadelphia, Pa.
NILES-BEMENT-POND CO., 111 Broadway, New York, N. Y...*p. 470*
Racine Tool & Machine Co. ("Racine"), Racine, Wis.
Swind Machinery Co., 1110 Widener Bldg., Philadelphia, Pa.

—Hack Saw
ATKINS, E. C. & CO. (Inc.), Indianapolis, Ind...*p. 506*
*STARRETT, L. S. CO., Athol, Mass...*p. 508*

CUTTING MACHINES (Paper, Cloth, Leather, Rubber, Etc.)
Cameron Machine Co., 57-61 Poplar St., Brooklyn, N. Y.
Dexter Folder Co., 28 W. 23rd St., New York, N. Y.
Federal Engineering Co., 588 Drexel Bldg., Philadelphia, Pa.
Racine Tool & Machine Co., Racine, Wis.
Robinson, John T. Co., Hyde Park Sta., Boston, Mass.

CYLINDERS

—Creosoting
Lasker Iron Works, 3201 So. Lincoln St., Chicago, Ill...*p. 655*
LYNCHBURG FOUNDRY CO., Lynchburg, Va...*p. 229*
*U. S. CAST IRON PIPE & FOUNDRY CO., Burlington, N. J...*pp. 232, 233*

—Gas
Welding Supply Co. (Inc.), 132 Nassau St., New York, N. Y.

—Gas (Seamless Steel)
Oxygen Products Co., 2525 Liberty Ave., Pittsburgh, Pa.

CYLINDER GRINDING
*LAMBERT & MANN CO., Wood & Walnut Sts., Chicago, Ill...*p. 561*

—Pump
Chippewa Pump Co., Chippewa Falls, Wis.
Myers, F. E. & Bro., Ashland, Ohio

CYLINDERS REBORED
Hartford Engine Works, 223 State St., Hartford, Conn.
LAMMERT & MANN CO., Wood & Walnut Sts., Chicago, Ill...*p. 561*
Wadell Motor Corp'n, 661 Frelinghuysen Ave., Newark, N. J.

D

DAIRY EQUIPMENT
Pfaudler Co,. 217 Cutler Bldg., Rochester, N. Y.

DAIRY MACHINERY
Ann Arbor Machine Co., Ann Arbor, Mich.
Associated Manufacturers Co., Waterloo, La.
Davis-Watkins Dairymen's Mfg. Co., 130 No. Wells St., Chicago, Ill.
KOVEN, L. O. & BROTHER, 154 Ogden Ave., Jersey City, N. J...*p. 605*

Da

Digitized by Google

Rice and Adams Corp'n, 180 Chandler St., Buffalo, N. Y.
Rutland Mfg. Co. (Inc.), Forest, West & Pine Sts., Rutland, Vt.

DAMPER REGULATORS
(See Regulators, Damper)

DAMPERS (Check)
DUNHAM, C. A. CO.. 230 East Ohio Street, Chicago, Ill...*p. 227*

DEHUMIDIFYING APPARATUS
*AMERICAN BLOWER CO., Detroit, Mich. *p. 553*
ATMOSPHERIC CONDITIONING CORP'N, 485 Chestnut St., Philadelphia, Pa...*p. 617*
*CARRIER ENGINEERING CORP'N, 39 Cortlandt St., New York, N. Y...*p. 620*
NEW YORK BLOWER CO. ("Peerless"), Chicago, Ill...*p. 555*

DEHYDRATING EQUIPMENT
DRYING SYSTEMS (Inc.), 11 S. Desplaines St., Chicago, Ill...*pp. 618, 619*
NEW YORK CENTRAL IRON WORKS CO. (INC.), North Middleburg Road, Hagerstown, Md...*p. 659*
PHILADELPHIA DRYING MACHINERY CO., 3351 Stokeley St., Philadelphia, Pa. *p. 610*
*TOLHOURST MACHINE WORKS, Troy, N. Y...*p. 616*

DERRICKS
AMERICAN HOIST & DERRICK CO., St. Paul, Minn...*p. 383*
Buffalo Contractors Plan Corp'n, 120 Erie St., Buffalo, N. Y.
Continental Bridge Co., Peotone, Ill.
Clyde Iron Works Sales Co., 29th Ave., W., & Michigan St., Duluth, Minn.
Horton, John T. Co., 242 Bradhurst Ave., New York, N. Y.
Insley Mfg. Co., E. St. Clair & Onley Sts., Indianapolis, Ind.
Lamport Hoisting Engine Co., 115 Poinier St., Newark, N. J.
Lane Mfg. Co., Montpelier, Vt.
*LIDGERWOOD MFG. CO., 96 Liberty St., New York, N. Y...*p. 388*
MORRIS, HERBERT (Inc.), 1-15 Lawrence Place, Buffalo, N. Y...*p. 403*
Mundy, J. S. Hoisting Engine Co., 722 Frelinghuysen Ave., New York, N. Y.
Parker, S. E., 3830 N. Kilbourn Ave., Chicago, Ill.
Shannon, J. Jacob & Co., 1744 Market St., Philadelphia, Pa.
TERRY MFG. CO., Grand Central Terminal, New York, N. Y...*p. 389*

—Steel
AMERICAN HOIST & DERRICK CO., St. Paul, Minn...*p. 383*
TERRY MFG. CO., Grand Central Terminal, New York, N. Y...*p. 389*

—Timber
AMERICAN HOIST & DERRICK CO., St. Paul, Minn...*p. 383*
TERRY MFG. CO., Grand Central Terminal, New York, N. Y...*p. 389*

DESTRUCTORS, REFUSE
Borge Incinerator Corp'n, 1216 Flatiron Bldg., New York, N. Y.
Decarie Incinerator Co., 817 McKnight Bldg., Minneapolis, Minn.
Jarvis Engineering Co., 51 Ellery St., Boston, Mass.
KEWANEE BOILER CO., Kewanee, Ill...*pp. 622, 623, 624*
Twin Fire Furnace Co., 1252 First National Bank Bldg., Chicago, Ill.
UNION ENGINEERING CO., Cleveland, Ohio. ..*p. 645*
*WASHBURN & GRANGER (Inc.) ("Dean"), 50 Church St., New York, N. Y...*p. 197*

DEVICES: *See*
Clamping
Elevator
Heating
Marking
Oiling
Pipe Threading
Safety
Sash Operating
Setting-up
Sharpening
Water Cooling
Wiring

DEVULCANIZERS
BIGGS BOILER WORKS CO., Case Ave. & Newton St., Akron, Ohio...*p. 650*

DIAMOND DRESSERS
Meyers, W. F. Co., Bedford, Ind.

DIAMONDS
—Drilling
Diamond Drill Carbon Co., 61 Park Row, New York, N. Y.

—For Mechanical Purposes
Desmond-Stephan Mfg. Co., Urbana, Ohio.
Dessau, Maurice S., 6 Maiden Lane, New York, N. Y.
Diamond Drill Carbon Co., 61 Park Row, New York, N. Y.
Meyers, W. F. Co., Bedford, Ind.

DIAPHRAMS, RUBBER
Continental Rubber Works, 19th & Liberty Sts., Erie, Pa.

DIE CASTINGS
(See Castings, Die Molded)

DIE CUTTING
HOGGSON & PETTIS MFG. CO., New Haven, Conn...*pp. 512, 513, 514*
KELLER MECHANICAL ENGRAVING CO., 68 Washington St., Brooklyn, N. Y...*p. 493*
NOBLE & WESTBROOK MFG. CO., Hartford, Conn...*p. 494*

DIE CUTTING MACHINERY
Luster-Jordan Co. (Inc.), W. Washington St., Norristown, Pa.
NILES-BEMENT-POND CO., 111 Broadway, New York, N. Y...*p. 470*
Oliver Instrument Co. ("Oliver of Adrian"), Adrian, Mich.

DIE FORMING MACHINES
Anderson Die Machine Co., 544 Tranistan Ave., Bridgeport, Conn.

DIE HEADS
—Pipe and Nipple Threading
GEOMETRIC TOOL CO., New Haven, Conn. ..*pp. 498, 499*
JONES & LAMSON MACHINE CO., Springfield, Vt...*pp. 450, 451, 452, 453, 454*
*LANDIS MACHINE CO. (Inc.), Waynesboro, Pa...*pp. 496, 497*

—Thread Cutting (Self-Opening)
Eastern Machine Screw Corp'n, New Haven, Conn.
Errington Mechanical Laboratory, Broadway & John St., New York, N. Y.
GEOMETRIC TOOL CO., New Haven, Conn. *pp. 498, 499*
Ideal Tool & Mfg. Co., Beaver Falls, Pa.
*JONES & LAMSON MACHINE CO. ("Hartness"), Springfield, Vt...*pp. 450, 451, 452, 453, 454*
*LANDIS MACHINE CO. (Inc.), Waynesboro, Pa...*pp. 496, 497*
Modern Tool Co., Erie, Pa.
Murchey Machine & Tool Co., 85 Porter St., Detroit, Mich.
NATIONAL ACME CO. ("Namco"), Cleveland, Ohio...*pp. 464, 465*

Digitized by Google

Rickert-Shafer Co., 613 W. 11th St., Erie, Pa.
Victor Tool Co., Waynesboro, Pa.

DIE MUZZLING MACHINES
Anderson Die Machine Co., 544 Iranistan Ave., Bridgeport, Conn.

DIE SINKING MACHINES
Becker Milling Machine Co., 53 Franklin St., Boston, Mass.
Jackson Machine Tool Co., 314 N. Jackson St., Jackson, Mich.
KELLER MECHANICAL ENGRAVING CO., 68 Washington St., Brooklyn, N. Y...*p. 493*
PRATT & WHITNEY CO., 111 Broadway, New York, N. Y...*p. 471*
Titan Automatic Tool Co., 25 W. Broadway, New York, N. Y.
WHITE, S. S., DENTAL MFG. CO., 84 Market St., New York, N. Y...*p. 359*

DIE STOCKS
(See Stocks and Dies)

DIES
Crawford Tool & Mfg. Co., 355 Union Park Court, Chicago, Ill.

DIES

—Bending
Pittsburgh Iron & Steel Foundries Co. ("Adamite"), 314 Oliver Bldg., Pittsburgh, Pa.

—Blanking
*BLISS, E. W. CO., Brooklyn, N. Y...*pp. 438, 439*
Cameron Can Machinery Co., 240 North Ashland Ave., Chicago, Ill.
City Engineernig Co., 35 S. St. Clair St., Dayton, Ohio
Columbus Die Tool and Machine Co., 1662 E. 118th St., Columbus, Ohio
Davie Tool Co., 1662 E. 118th St., Cleveland, Ohio
Electric Co., 94 Allyn St., Hartford, Conn.
Franklin Die Tool Co., Beck & Park Sts., Columbus, Ohio
Gem City Machine Co., 434 E. First St., Dayton, Ohio
GEUDER, PAESCHKE & FREY CO., Western Valley, Milwaukee, Wis...*p. 434*
Marvin, W. B. Mfg. Co., Urbama, Ohio
Meyers, W. F. Co., Bedford, Ind.
Modern Tool & Machine Works, (Inc.), 344-350 Mulberry St., Newark, N. J.
Pannier Bros. Stamp Co. (Inc.), 209 Sandusky St., Pittsburgh, Pa.

—Cutting (Paper, Cloth and Rubber)
DOVE-SMITH & SON, Niagara Falls, N. Y...*p. 492*
HOGGSON & PETTIS MFG. CO., New Haven, Conn...*pp. 512, 513, 514*
V. & O. Press Co., Glendale, Brooklyn, N. Y.

—Drawing
*BLISS, E. W. CO., Brooklyn, N. Y...*pp. 438, 439*
GEUDER, PAESCHKE & FREY CO., Western Valley, Milwaukee, Wis...*p. 434*
Robbins Gamwell & Co., 68 West St., Pittsfield, Mass.
Winchester Repeating Arms Co., New Haven, Conn.

—Forging
Die Casting Co., of New Jersey, 39 Sharon Ave., Irvington, N. J.
KELLER MECHANICAL ENGRAVING CO., 68 Washington St., Brooklyn, N. Y...*p. 493*
Little Giant Co., Mankato, Minn.
Pittsburgh Iron & Steel Foundries Co. ("Adamite"). 314 Oliver Bldg., Pittsburgh, Pa.
Winchester Repeating Arms Co., New Haven, Conn.

—Medal and Coining
KELLER MECHANICAL ENGRAVING CO., 68 Washington St., Brooklyn, N. Y...*p.*

—Punching
*BLISS, E. W. CO., Brooklyn, N. Y...*pp. 438, 439*
GEUDER, PAESCHKE & FREY CO., Westeern Valley, Milwaukee, Wis...*p. 434*
Lewthwaite, T. H. Machine Co., 411 E. 31st St., New York, N. Y.
MARCHANT, GEO. F. CO., 1420-28 S. Rockwell St., Chicago, Ill...*p. 505*
NIAGARA MACHINE TOOL WORKS, Buffalo,, N. Y...*p. 443*
Taylor-Shantz Co., 478-86 St. Paul St., Rochester, N. Y.

—Rivet Machine
MARCHANT, GEO. F. CO., 1420-28 S. Rockwell St., Chicago, Ill...*p. 505*

—Sheet Metal Working
*BLISS, E. W. CO., Brooklyn, N. Y...*pp. 438, 439*
Gilro Machine Co., Ft. of 9th Ave, Oakland, Cal.
Grand Rapids Brass Co., 90 Scribner Ave., N. W., Grand Rapids, Mich.
KELLER MECHANICAL ENGRAVING CO., 68 Washington St., Brooklyn, N. Y...*p. 493*
Lansing Stamping Co., Lansing, Mich.
Leffer, Charles & Co., 71 Clymer St., Brooklyn, N. Y.
McDonald Machine Co., 7600 So. Racine Ave., Chicago, Ill.
Marvin, W. B. Mfg. Co., Urbana, Ohio
Maute, J., Sons Die & Tool Works, 21-23 Kane St., Buffalo, N. Y.
NIAGARA MACHINE & TOOL WORKS, Buffalo, N. Y...*p. 443*
Robbins, Gamwell & Co., 68 West St., Pittsfield, Mass.
Robinson Tool Works, Inc., Baldwin St. & Delsey St., Waterbury, Conn.
Toledo Machine & Tool Co., Toledo, Ohio,
Urbana Tool and Die Co., Urbana, Ohio
V & O Press Co., Glendale, Brooklyn, N. Y.

—Stamping
*BLISS, E. W. CO., Brooklyn, N. Y...*pp. 438, 439*
Coleman Far Box Co. (Ltd.), 1191 Bathurst St., Toronto, Canada
Dodge Tool Co., Grinnell, Ia.
GEUDER, PAESCHKE & FREY CO., Western Valley, Milwaukee, Wis...*p. 434*
Lansing Stamping Co., Lansing, Mich.
McCall Machine Works, 573 Lyell Ave., Rochester, N. Y.
Maute, J. Sons Dies & Tool Works, 21-23 Kane St., Buffalo, N. Y.
NIAGARA MACHINE & TOOL WORKS, Buffalo, N. Y...*p. 443*
Pittsburgh Iron & Steel Foundries Co., 514 Oliver Bldg., Pittsburgh, Pa.
Production Tool & Engrg. Co., 507 W. Jackson Blvd., Chicago, Ill.
Robbins, Gamwell & Co., 68 West St., Pittsfield, Mass.
Winchester Repeating Arms Co., New Haven, Conn.

—Sub-Press
*BLISS, E. W. CO., Brooklyn, N. Y...*pp. 438, 439*
GEUDER, PAESCHKE & FREY CO., Western Valley, Milwaukee, Wis...*p. 434*
Griswold, Geo. M. Machine Co., New Haven, Conn.
Robbins, Gamwell & Co., 68 West St., Pittsfield, Mass.
Sheffield Machine & Tool Co., Dayton, Ohio
Urbana Tool and Die Co., Ubana, Ohio
Waltham Machine Work, Waltham, Mass.

—Thread Cutting
American Tap & Die Co., Greenfield, Mass.

Digitized by Google

*CRANE CO., 836 S. Michigan Ave., Chicago, Ill...*pp. 170, 171, 172, 173*
GEOMETRIC TOOL CO., New Haven, Conn. ...*pp. 498, 499*
*LANDIS MACHINE CO. (Inc.), Waynesboro, Pa...*pp. 496, 497*
NATIONAL ACME CO. ("Nanco"), Cleveland, Ohio...*pp. 464, 465*
PRATT & WHITNEY CO., 111 Broadway, New York, N. Y...*p. 471*
Russell Mfg. Co., Greenfield, Mass.

—Thread Rolling
Cleveland Die & Mfg. Co., 748 E. 82nd St., Cleveland, Ohio

DIESEL ENGINES
—(See Engines, Oil, Diesel)

DIFFERENTIALS, AUTOMOBILE
Ganschow, Wm. Co., Washington-Morgan St., Chicago, Ill.
Warner Gear Co., Muncie, Ind.
Warren Gear Products Co., Warren, Pa.

DIGESTERS
BARTLETT, C. O. & SNOW CO., Cleveland, Ohio...*p. 367*
BIGGS BOILER WORKS CO., Case Ave. & Newton St., Akron, Ohio...*p. 650*
*CASEY-HEDGES CO., Chattanooga, Tenn. ...*pp. 60, 61*
DEVINE, J. P. CO., 1375 Clinton St., Buffalo, N. Y...*pp. 606, 607*
HOOVEN, OWENS, RENTSCHLER CO., Hamilton, Ohio...*p. 10*
KOVEN, L. O. & BROTHER, 154 Ogden Ave., Jersey City, N. J...*p. 605*
LEBANON BOILER WORKS (J. K. Petty & Co., Inc.), 6 So. 15th St., Philadelphia, Pa...*pp. 78, 79*
SWENSON EVAPORATOR CO., 945 Monadnock Bldg., Chicago, Ill...*p. 611*
*U. S. CAST IRON PIPE & FOUNDRY CO., Burlington, N. J...*pp. 232, 233*

—Welded
American Welding Co., Carbondale, Pa.
Kellogg, M. W. Co., 90 West St., New York, N. Y.
NEWBURGH STEAM BOILER WORKS (P. Delany & Co.), Newburgh, N. Y...*p. 64*

DIGGING MACHINERY
Hayward Co., 50 Church St., New York, N. Y.

—Hydraulic
Bennett, Howard D., 2114 Allendale St., Baltimore, Md.

DIPPING BASKETS
Morss & Whyte Co., Sidney & Pilgrim St., Cambridge, Mass.

DISCS

—Abrasive
Badger Tool Co., Beloit, Wis.
Gardner Machine Co., Beloit, Wis.

—Fibre
DIAMOND STATE FIBRE CO., Bridgeport, Pa...*p. 420*

—Friction (High Speed)
ATKINS, E. C. & CO. (Inc.), Indianapolis, Ind...*p. 506*

—Steel
ATKINS, E. C. & CO. (Inc.), Indianapolis, Ind...*p. 506*
AUBURN BALL BEARING CO., 22 Elizabeth St., Rochester, N. Y...*p. 340*

—Steel (Forged)
VULCAN STEAM FORGING CO., 247 Rano St., Buffalo, N. Y...*p. 433*

—Valve
AMERICAN VULCANIZED FIBRE CO., Wilmington, Del...*p. 417*
*CRANE CO., 836 S. Michigan Ave., Chicago, Ill...*pp. 170, 171, 172, 173*
*GOETZE GASKET & PACKING CO. ("Goetze"), 11 Allen Ave., New Brunswick, N. J...*p. 256*
GOODRICH, B. F. RUBBER CO., Akron, Ohio...*pp. 258, 259*
La Favorite Rubber Mfg. Co., Paterson, N. J.
*RICHARDSON-PHENIX CO., 126 Reservoir Ave., Milwaukee, Wis...*pp. 248, 249*

DISINTEGRATING MACHINERY
Abbe Engrg. Co., 220 Broadway, New York, N. Y.
BARTLETT, C. O. & SNOW CO., Cleveland, Ohio...*p. 367*
*CASEY-HEDGES CO., Chattanooga, Tenn. ...*pp. 60, 61*
*FULLER-LEHIGH CO., Fullerton, Pa...*p. 128*
JEFFREY MFG. CO., 904 No. 4th St., Columbus, Ohio...*pp. 376, 377*
Stedman's Foundry & Machine Works, Aurora, Ind.
STURTEVANT MILL CO., Harrison Sq., Boston (22), Mass...*pp. 600, 601*
WILLIAMS PATENT CRUSHER & PULVERIZER CO., St. Louis, Mo...*pp. 602, 603*

DISTILLING APPARATUS
*BADGER, E. B. & SONS CO., 75 Pitts St., Boston, Mass...*p. 164*
*BRAUN, C. F. & CO., San Francisco, Cal... *pp. 156, 157*
*DE LA VERGNE MACHINE CO., 1123 E. 138th St., New York, N. Y...*p. 40*
Harris, Arthur & Co., 212 Curtis St., Chicago, Ill.
Hodges Water Still Co. (Inc.), 5713 Appletree St., Philadelphia, Pa.
KOVEN, L. O. & BROTHER, 154 Ogden Ave., Jersey City, N. J...*p. 605*
*SCHUTTE & KOERTING CO., 1184 Thompson St., Philadelphia, Pa...*p. 159*
STANDARD WATER SYSTEM CO. ("Multicoil"), Hampton, N. J...*p. 144*
Struthers-Wells Co., Warren, Pa.
SWENSON EVAPORATOR CO., 945 Monadnock Bldg., Chicago, Ill...*p. 611*
Western Gas Construction Co., Fort Wayne, Ind.
*WHEELER CONDENSER & ENGINEERING CO., Carteret, N. J...*p. 162*

DITCHERS, RAILROAD
AMERICAN HOIST & DERRICK CO., St. Paul, Minn...*p. 383*
Marion Steam Shovel Co., Marion, Ohio

DIVIDING HEADS
Simmons Machine Co. (Inc.), 985 Broadway, Albany, N. Y.
Steptoe John Co., Stock Yards Station, Cincinnati, Ohio

DIVING APPARATUS
Morse, Andrew J. & Son (Inc.), 221 High St., Boston, Mass.

DOOR AND STEP CONTROL
Consolidated Car-Heating Co., 413 N. Pearl St., Albany, N. Y.

DOOR HANGERS
—(See Hangers, Door)

DOOR LOCKS, SAFETY

—Boiler Furnace
DeWaters Safety Latch Co. (Inc.), Far Rockaway, N. Y.

—Elevator
DeWaters Safety Latch Co. (Inc.), Far Rockaway, N. Y.
Maintenance Co. (Inc.), 449-53 W. 42nd St., New York, N. Y.

DOORS

—Chain, Furnace
Codd, E. J. Co., 700 S. Carolina St., Baltimore, Md.

Digitized by Google

—Fire Proof
Alignum Fireproof Products Co., 44 Whitehall St., New York, N. Y.
Coburn Trolley Track Mfg. Co., Holyoke, Mass.
Kinnear Mfg. Co., Columbus, Ohio
Penn Metal Co. ("Penco"), 65 Franklin St., Boston, Mass.

—Mechanically Operated
Ogden, J. Edward Co. (Inc.), 147 Cedar St., New York, N. Y.

—Sidewalk Elevator (Automatic, Safety)
GILLIS & GOEGHEGAN, 543 W. Broadway, New York, N. Y...*p. 406*
*WASHBURN & GRANGER (Inc.), 50 Church St., New York, N. Y...*p. 127*

DOORS AND FRAMES

—Furnace
Budd Grate Co., 2013 E. Letterly St., Philadelphia, Pa...*p. 123*
Codd, E. J. Co., 700 S. Carolina St., Baltimore, Md.
*WASHBURN & GRANGER (Inc.), 50 Church St., New York, N. Y...*p. 127*

—Industrial Apparatus
Biggs Boiler Works Co., Case Ave & Newton St., Akron, Ohio..*p. 650*

DOORS AND SHUTTERS
—Steel (Fire)
Bayley, William Co., Springfield, Ohio
Kinnear Mfg. Co., Columbus, Ohio
Merchant & Evans Co., 2019-2035 Washington Ave., Philadelphia, Pa.

—Steel, Rolling
Kinnear Mfg. Co., Columbus, Ohio
Wilson, J. G. Corp'n, 8 West 40th St., New York, N. Y.

DRAFT CONTROL SYSTEMS
*ENGINEER CO. ("Balanced Draft"), 17 Battery Place, New York, N. Y...*pp. 108, 109*

DRAFT, MECHANICAL
(See Mechanical Draft Apparatus)

DRAFT GEARS (Railroad)
Symington, T. H. Co. ("Tarlow"), 233 Broadway, New York, N. Y.

DRAFTING MACHINES
Universal Drafting Mach. Co., Cleveland, Ohio

DRAFTING ROOM FURNITURE
American Drafting Furniture Co., Rochester, N. Y.
Cole, H. Co., 68 E. Gay St., Columbus, Ohio
Economy Drawing Table & Mfg. Co., Adrian, Mich.
Hamilton Mfg. Co., Two Rivers, Wis.
Keuffel & Esser Co., 127 Fulton Street, New York, N. Y.
Kolesch & Co., 138 Fulton Street, New York, N. Y.
New York Blue Print Paper Co., 102 Reade St., New York, N. Y.
PEASE, C. F. CO., 843 N. Franklin St., Chicago, Ill...*p. 664*
Post, Frederick Co., 3635 N. Hamilton Ave., Chicago, Ill.
United States Blue Print Paper Co., 201-207 S. Wabash Ave., Chicago, Ill.
Washburn Shope of the Worcester Polytechnic Institute, Worcester, Mass.
Yawman & Erbe Mfg. Co., Rochester, N. Y.

DRAG LINE EXCAVATORS
(See Excavating Machinery)

DRAW BENCHES
Perkins Machine Co., Warren, Mass.
Winterhoff Tool & Machine Co., Elkhart, Ind.

DRAWING MATERIALS
Dietzgen, Eugene Co., Chicago, Ill.
Defiance Mfg. Co., 22 E. 41st St., New York, N. Y.
Keuffel & Esser Co., Hoboken, N. J.
Kolesch & Co., 138 Fulton St., New York, N. Y.
New York Blue Print Paper Co., 102 Reade St., New York, N. Y
PEASE, C. F. CO., 843 N. Franklin St., Chicago, Ill...*p. 664*
Weber, F. Co., 1220 Buttonwood St., Philadelphia, Pa.

DREDGING MACHINERY
Bennett, Howard D., 2114 Allendale St., Baltimore, Md.
Bucyrus Co., South Milwaukee, Wis.
ELLICOTT MACHINE CORP'N, Baltimore, Md...*p. 588*
Fairbanks Steam Shovel Co., Marion, Ohio
Flory, S. Mfg. Co., Bangor, Pa.
Hayward Co., 50 Church St., New York, N. Y
*LIDGERWOOD MFG. CO., 96 Liberty St., New York, N. Y...*p. 388*
Marion Steam Shovel Co., Marion, Ohio
*MORRIS MACHINE WORKS, Baldwinsville, N. Y...*pp. 578, 579*
Norbom Engineering Co., 712 Denckla Bldg., Philadelphia, Pa.
Osgood Co., Marion, Ohio
POOLE ENGINEERING & MACHINE CO., Woodberry, Baltimore, Md...*pp. 316, 317*
Superior Iron Works Co., Superior, Wis.
Tampa Shipbuilding & Engineering Co., Tampa, Fla.
Yuba Mfg. Co., Marysville, Cal.

—Gold
NEW YORK ENGINEERING CO., 2 Rector St., New York, N. Y...*p. 82*

DREDGING SLEEVES
GOODRICH, B. F. RUBBER CO., Akron, Ohio...*pp. 258, 259*

DRIFTS
CLEVELAND TWIST DRILL CO., Cleveland, Ohio..*p. 502*

DRILL HEADS
Hoefer Mfg. Co., Freeport, Ill.
NELSON-BLANCK MFG. CO., 1662 Dubois St., Detroit, Mich...*pp. 500, 501*
Sellew Machine Tool Co., 28 Bayley St., Pawtucket, R. I.
Spafford Tool Works ("Fortin"), 10 Hoadley Place, Hartford, Conn.
United States Drill Head Co., 1950 West Sixth St., Cincinnati, Ohio
U. S. Machine Tool Co., Richmond & McLean Ave., Cincinnati, Ohio

—Multiple Spindle
NELSON-BLANCK MFG. CO., 1662 Dubois St., Detroit, Mich...*pp. 500, 501*
United States Drill Head Co., 1950 West Sixth St., Cincinnati, Ohio

DRILL SHARPENERS
*INGERSOLL-RAND CO., 11 Broadway, New York, N. Y...*pp. 546, 547*
SULLIVAN MACHINERY CO. ("All-Hammer"), 120 S. Michigan Ave., Chicago, Ill. *p. 549*

DRILL SOCKETS AND SLEEVES
American Specialty Co. ("Use-Em-Up"), 325 W. Ohio St., Chicago, Ill.
CLEVELAND TWIST DRILL CO. ("Perfect"), Cleveland, Ohio..*p. 502*

DRILL STANDS
Alemite Die-Casting & Mfg. Co., 2640-2654 Belmont Ave., Chicago, Ill.

DRILLING AND TAPPING MACHINES
COLBURN MACHINE TOOL CO. (The), Cleveland, Ohio..*pp. 466, 467*
Demco Machines Tool Co., 706 Frankfort Ave., N. W., Cleveland, Ohio

DRILLING ATTACHMENTS (High Speed)
Graham Mfg. Co., Providence, R. I.

Dr

Digitized by Google

Harris, H. E. Engineering Co. ("Harris"), 1047 Broad St., Bridgeport, Conn.

DRILLING CABLES

American Mfg. Co., Noble & West Sts., Brooklyn, N. Y.
Columbian Rope Co., Auburn, N. Y.
Macwhyte Co., Kenosha, Wis.
*ROEBLING'S, JOHN A. SONS CO., Trenton, N. J...*p. 409*

DRILLING MACHINES

—Automatic, Multiple Spindle

Cincinnati Automatic Machine Co. ("Cincinnati-Gridley"), Cincinnati, Ohio

—Bench

Burke Machine Tool Co., Conneaut, Ohio
Cincinnati Pulley Machinery Co., Cincinnati, Ohio
Elgin Tool Works, Elgin, Ill.
Henry & Wright Mfg. Co., 760 Windsor St., Hartford, Con.
High Speed Hammer Co. (Inc.), 318 Norton St., Rochester, N. Y.
Miller Falls Co., Miller Falls, Mass.
Myers Machine Tool Corp'n, Second & Chestnut St., Columbia, Pa.
NILES-BEMENT-POND CO., 111 Broadway, New York, N. Y...*p. 470*
Oliver, W. W. Mfg. Co., 1483 Niagara St., Buffalo, N. Y.
Rockford Drilling Machine Co., Rockford, Ill.
*ROYERSFORD FOUNDRY & MACHINE CO. (Inc.), 52 N. 5th St., Philadelphia, Pa...*pp. 346, 347*
Standard Electric Tool Co., Cincinnati, Ohio
Winterhoff Tool & Machine Co., Elkhart, Ind.

—Electric, Portable

American Electric Tool Co., West Newton, Mass.
Black & Decker Mfg. Co., 109-15 S. Calvert St., Baltimore, Md.
CHICAGO PNEUMATIC TOOL CO. ("Little Giant"), 6 East 44th St., New York, N. Y. *p. 548*
Cincinnati Electrical Tool Co., Freeman & Flint Sts., Cincinnati, Ohio
Clark, Jas. Jr., Electric Co., 520 W. Main St., Louisville, Ky.
Coates Clipper Mfg. Co., 237 Chandler St., Worcester, Mass.
Electro-Magnetic Tool Co., 2902 Carroll Ave., Chicago, Ill.
Fortuna Machine Co., 127 Duane St., New York, N. Y.
Haskins, R. G., 27 S. Desplaines St., Chicago, Ill.
Hisey Wolf Machine Co., Cincinnati, Ohio
Independent Pneumatic Tool Co. ("Thor"), 600 W. Jackson Blvd., Chicago, Ill.
Neil & Smith Electric Tool Co., 813-815 Broadway, Cincinnati, Ohio
Peterson, A. H. Mfg. Co., Milwaukee, Wis.
Standard Electric Tool Co., Cincinnati, Ohio
Stow Mfg. Co., 449 State St., Binghamton, N. Y.
Temco Electric Motor Co., 66 Sugar St, Leipsic, Ohio
United States Electrical Tool Co., 2430 West 6th St, Cincinnati, Ohio
Van Dorn Electric Tool Co. ("VanDorn"), Cleveland, Ohio
Wisconsin Electric Co., Racine, Wis.

—Flexible Shaft, Portable

Stow Flexible Shaft Co., 3452 Ludlow St., Philadelphia, Pa.

—Gun Barrel

PRATT & WHITNEY CO., 111 Broadway, New York N. Y...*p. 471*

—Heavy Duty

Baker Brothers, Post & Westlake St., Toledo, Ohio
COLBURN MACHINE TOOL CO. (The), Cleveland, Ohio..*pp. 466, 467*
Foote-Burt Co., Cleveland, Ohio
NILES-BEMENT-POND CO., 111 Broadway, New York, N. Y...*p. 470*
Sibley Machine Co., South Bend, Ind.

—High Speed

Demco Machine Tool Co., 706 Frankfort Ave., N. W., Cleveland, Ohio
Edlund Machinery Co. (Inc.), Cortland, N. Y.

—Horizontal

Barnes, W. F. & John Co., Rockford, Ill.
Detroit Machine Tool Co., 6545 St. Antoine St., Detroit, Mich.
Morris Machine Tool Co., Court & Harriet Sts., Cincinnati, Ohio
National Automatic Tool Co., Richmond, Ind.
NILES-BEMENT-POND CO., 111 Broadway, New York, N. Y...*p. 470*
Rockford Drilling Machine Co., Rockford, Ill.

—Multiple Spindle

Barnes Drill Co. (Inc.), 814-830 Chestnut St., Rockford, Ill.
Barnes, W. F. & John Co., Rockford, Ill.
Baush Machine Tool Co., Springfield, Mass.
Cincinnati Bickford Tool Co., 3220 South St., Cincinnati, Ohio
Cincinnati Pulley Machinery Co., Cincinnati, Ohio
COLBURN MACHINE TOOL CO. (The), Cleveland, Ohio..*pp. 466, 467*
Defiance Machine Works, Defiance, Ohio
Demco Machine Tool Co., 706 Frankfort Ave., N. W., Cleveland, Ohio
Detroit Machine Tool Co., 6545 St. Antoine St., Detroit, Mich.
Edlund Machinery Co. (Inc.), Cortland, N. Y.
Foote-Burt Co, Cleveland, Ohio
Fox Machine Co., 1807 W. Gansom St., Jackson, Mich.
Greenlee Bros. & Co., Rockford, Ill.
Harrington, Edwin Son & Co. (Inc.), S. E. Cor 17th & Callowhill Sts., Philadelphia, Pa.
Hoefer Mfg. Co., Freeport, Ill.
Langelier Mfg. Co., 51 Washington Ave., Arlington, Cranston, R. I.
Lima Drill Press Co., 207 Holland Block, Lima, Ohio
Michigan Machine Tool & Fdry Co., Ypsilanti, Mich.
Moline Tool Co., Moline, Ill.
NATIONAL ACME CO. ("Namco"), Cleveland, Ohio *pp. 464, 465*
National Automatic Tool Co., Richmond, Ind.
NILES-BEMENT-POND CO., 111 Broadway, New York, N. Y...*p. 470*
PRATT & WHITNEY CO., 111 Broadway, New York, N. Y...*p. 471*
Sipp Machine Co., Paterson, N. J.

—Pneumatic, Portable

Canton Pneumatic Tool Co., Canton, Ohio
CHICAGO PNEUMATIC TOOL CO. ("Little Giant"), 6 E. 44th St., New York, N. Y. *p. 548*
Cleveland Pneumatic Tool Co., 6410 Hawthorne Ave., Cleveland, Ohio
Independent Pneumatic Tool Co. ("Thor"), 600 W. Jackson Blvd., Chicago, Ill.
*INGERSOLL-RAND CO. ("Little David"), 11 Broadway, New York, N. Y...*pp. 546, 547*
Keller Pneumatic Tool Co., Grand Haven, Mich.

—Radial

American Tool Works Co., Pearl & Eggleston Ave., Cincinnati, Ohio
Carlton Machine Tool Co., Spring Grove Ave. & Meeker St., Cincinnati, Ohio
Cincinnati Bickford Tool Co., 3220 South St., Cincinnati, Ohio
Dauber Kratsch Co., Oshkosh, Wis.
Dreses Machine Tool Co., 227 W. McMicken Ave., Cincinnati, Ohio

Digitized by Google

Fosdick Machine Tool Co., Blue Rock & Apple Sts., Cincinnati, Ohio
Hammond Mfg. Co., 336 Frankfort Ave., Cleveland, Ohio
Hawes, C. L., 12 Adams St., Ashtabula, Ohio
Henry & Wright Mfg. Co., 760 Windsor St., Hartford, Conn.
Lynd-Farquhar Co., 419-425 Atlantic Ave., Boston, Mass.
Morris Machine Tool Co., Cincinnati, Ohio
Mueller Machine Tool Co., 2425 Colerain Ave., Cincinnati, Ohio
NILES-BEMENT-POND CO., 111 Broadway, New York, N. Y...*p. 470*
Reed-Prentice Co., Worcester, Mass.
Silver Mfg. Co., Salem, Ohio
Sipp Machine Co., Paterson, N. J.
Western Machine Tool Works ("Western"). Holland, Mich.

—Sensitive
Allen Machine Co., 1585 Columbus Rd., N. W., Cleveland, Ohio
Buckeye Drill and Lathe Co., Marion Road, Columbus, Ohio
Carlton Machine Tool Co., Spring Grove Ave. & Meeker St., Cincinnati, Ohio
Davenport Machine Tool Co. (Inc.), Rochester, N. Y.
Edlund Machinery Co. (Inc.), Cortland, N. Y.
Hammond Mfg. Co., 336 Frankfort Ave., Cleveland, Ohio
Henry & Wright Mfg. Co., 760 Windsor St., Hartford, Conn.
High Speed Hammer Co. (Inc.), 313 Norton St., Rochester, N. Y.
Langelier Mfg. Co., 51 Washington Ave., Arlington, Cranston, R. I.
Leland-Gifford Co., Worcester, Mass.
PRATT & WHITNEY CO., 111 Broadway, New York, N. Y...*p. 471*
Reed, Francis Co., 43 Hammond St., Worcester, Mass.
*ROYERSFORD FOUNDRY & MACHINE CO. (Inc.), 52 N. 5th St., Philadelphia, Pa...*pp. 846, 847*
Sibley Machine Co., South Bend, Ind.
Sipp Machine Co., Paterson, N. J.
Taylor & Fenn Co., Hartford, Conn.
U. S. Machine Tool Co., Richmond & McLean Ave., Cincinnati, Ohio
Washburn Shops of the Worcester Polytechnic Institute, Worcester, Mass.

—Staybolt
Richmond Metal Products Co. (Inc.), 5th & Arch Sts., Richmond, Va.

—Turret
Turner Machine Co., 28-40 Maple Ave., Danbury, Conn.

—Vertical
Aurora Tool Works, Aurora, Ind.
Barnes, W. F. & John Co., Rockford, Ill.
Barnes Drill Co. (Inc.), 814-830 Chestnut St., Rockford, Ill.
Boynton & Plummer (Inc.), Chester Depot, Vt.
Canedy-Otto Mfg. Co., Chicago Heights, Ill.
Cincinnati Bickford Tool Co., 3220 South St., Cincinnati, Ohio
Dauber Kratsch Co., Oshkosh, Wis.
Fosdick Machine Tool Co., Blue Rock & Apple St., Cincinnati, Ohio
Gardam, Wm. & Son (Inc.), 114 Park Place, New York, N. Y.
Hoefer Mfg. Co., Freeport, Ill.
NILES-BEMENT-POND CO. 111 Broadway, New York, N. Y...*p. 470*
Rockford Drilling Machine Co., Rockford, Ill.
Rockford Machine Tool Co., Rockford, Ill.
*ROYERSFORD FOUNDRY & MACHINE CO. (Inc.), 52 N. 5th St., Philadelphia, Pa...*pp. 846, 847*
Sibley Machine Co., South Bend, Ind.
Silver Mfg. Co., Salem, Ohio
Turner Machine Co. ("Quint"), 28-40 Maple Ave., Danbury, Conn.

DRILLING RIGS (Portable)
NATIONAL SUPPLY CO. ("National"), Toledo, Ohio..*pp. 648, 649*

DRILLS
—Blacksmiths'
Buffalo Forge Co., 490 Broadway, Buffalo, N. Y.
Champion Blower & Forge Co., Lancaster, Pa.

—Center
Slocomb, J. T. Co., 35 Clifford St., Providence, R. I.
Cogsdill Mfg. Co., 5132 Grand River Ave., Detroit, Mich.

—Coal
CHICAGO PNEUMATIC TOOL CO. ("Little Giant"), 6 East 44th St., New York, N. Y...*p. 548*
Martin Hardsogg Co., 920 South Ave., Pittsburgh, Pa.

—Coal (Electric)
JEFFREY MFG. CO., 904 N. 4th St., Columbus, Ohio..*pp. 376, 377*

—Coal (Pneumatic)
CHICAGO PNEUMATIC TOOL CO., 6 East 44th St. ("Little Giant"), New York, N. Y...*p. 548*

—Concrete. Electric
Electro-Magnetic Tool Co., 2902 Carroll Ave., Chicago, Ill.

—Core
*INGERSOLL-RAND CO., ("Calyx"), 11 Broadway, New York, N. Y...*pp. 546, 547*
Standard Diamond Drill Co., 745 First National Bank Bldg., Chicago, Ill.
SULLIVAN MACHINERY CO., 120 S. Michigan Ave., Chicago, Ill...*p. 549*

—Diamond
Standard Diamond Drill Co., 745 First National Bank Bldg., Chicago, Ill.
SULLIVAN MACHINERY CO., 120 S. Michigan Ave., Chicago, Ill...*p. 549*

—Hand Hammer
*INGERSOLL-RAND CO. ("Jackhamer") ("Stopehamer"), 11 Broadway, New York, N. Y...*pp. 546, 547*

—Percussion (Hand Operated)
DIAMOND EXPANSION BOLT CO. ("Rapid Fire"), 90 West St. Cor. Cedar, New York, N. Y...*p. 526*

—Prospecting
NEW YORK ENGINEERING CO., 2 Rector St., New York, N. Y...*p. 82*
SULLIVAN MACHINERY CO., 120 S. Michigan Ave., Chicago, Ill...*p. 549*

—Ratchet
Keystone Mfg. Co. ("Keystone"), 41-51 Chandler St., Buffalo, N. Y.

—Rock
Armstrong Mfg. Co., Waterloo, Iowa
CHICAGO PNEUMATIC TOOL CO. ("Hummer"), 6 E. 44th St., New York, N. Y...*p. 548*
JEFFREY MFG. CO., 904 N. 4th St., Columbus, Ohio..*pp. 376, 377*
*GENERAL ELECTRIC CO., Schenectady, N. Y...*pp. 18, 19, 20, 21*
Hughes Tool Co., Houston, Texas
*INGERSOLL-RAND CO. ("Sergeant," "Butterfly," "Leyner-Ingersoll"), 11 Broadway, N. Y...*pp. 546, 547*
Martin Hardsogg Co., 920 South Ave., Pittsburgh, Pa.
Pneumelectric Corp'n, 219 Wyoming St., Syracuse, N. Y.

Digitized by Google

SULLIVAN MACHINERY CO. (''Lite-weight,'' ''Hy-Speed''), 120 S. Michigan Ave., Chicago, Ill...*p. 549*

—Stone
CHICAGO PNEUMATIC TOOL CO. (''Hummer''), 6 E. 44th St., New York, N. Y.
DIAMOND EXPANSION BOLT CO. (''Diamond''), 90 West St., cor. Cedar, New York, N. Y...*p. 526*
*INGERSOLL-RAND CO., 11 Broadway, New York, N. Y...*pp. 546, 547*

—Twist
Alvord Reamer & Tool Co., Millersburg, Pa.
American Machine Products Co., 18th & Howard Sts., Detroit, Mich.
Bridgeport Cutter Works (Inc.), 50 Reamer St., Bridgeport Conn.
Buckeye Twist Drill Co., Alliance, Ohio
CLEVELAND TWIST DRILL CO. (''Paragon''), Cleveland, Ohio...*p. 502*
Colton, Arthur Co., 2600 E. Jefferson Ave., Detroit, Mich.
Davidson Tool Mfg. Corp'n, 120-124 Maiden Lane, New York, N. Y.
Detroit Twist Drill Co., 634 Fort St., W., Detroit, Mich.
Fastfeed Drill & Tool Corp'n (''Fastfeed''), Clinton & Oakwood Sts., Toledo, Ohio
Latrobe Tool Co., Latrobe, Pa.
Morse Twist Drill & Machine Co., New Bedford, Mass.
National Twist Drill & Tool Co., Brush near Boulevard, Detroit, Mich.
New Process Twist Drill Co., 34 Court St., Taunton, Mass.
Rich Tool Co., 513 Railway Exchange, Chicago, Ill.
Standard Tool Co., 6900 Central Ave., Cleveland, Ohio
Sterling Products Co. (Inc.), 549 Washington Blvd., Chicago, Ill.
Syracuse Twist Drill Co., Syracuse, N. Y.
Union Twist Drill Co., Athol, Mass.
Whitman & Barnes Mfg. Co., 114 E. Burhtel Ave., Akron, Ohio
Ypsilanti Twist Drill Co., 15-23 E. Cross St., Ypsilanti, Mich.

—Well
Armstrong Mfg. Co., Waterloo, Iowa

DROP FORGINGS, HAMMERS, PRESSES, ETC. (See Forgings, Hammers, Presses, etc., Drop)

DROPS

—Board
*BLISS, E. W. CO., Brooklyn, N. Y...*pp. 438, 439*

—Gravity
*SEDGWICK MACHINE WORKS, 146 W. 15th St., New York, N. Y...*p. 407*

DRY BLAST PLANTS
*CARRIER ENGINEERING CORP'N, 39 Cortlandt St., New York, N. Y...*p. 620*

DRY KILNS
(See Kilns, Dry)

DRYERS

—Asbestos
PHILADELPHIA DRYING MACHINERY CO. (''Hurricane''), 3351 Stokeley St., Phiadelphia, Pa...*p. 610*

—Brick
STEACY-SCHMIDT MFG. CO., York, Pa...*p. 612*

—Centrifugal
AMERICAN TOOL & MACHINE CO., Boston, 9, Mass...*p. 614*

—Chemical
*AMERICAN BLOWER CO., Detroit, Mich. *p. 553*
Buckeye Dryer Co. (Inc.), 243 N. High St., Columbus, Ohio
DEVINE, J. P. CO., 1375 Clinton St., Buffalo, N. Y...*pp. 606, 607*
DRYING SYSTEMS (Inc.) (''Greef,'' ''Wenborne Karpen''), 11 S. Desplaines St., Chicago, Ill...*pp. 618, 619*
LOUISVILLE DRYING MACHINERY CO., Louisville, Ky...*p. 608*
PHILADELPHIA DRYING MACHINERY CO. (''Hurricane''), 3351 Stokeley St., Philadelphia, Pa...*p. 610*
Proctor & Schwartz (Inc.), 7th & Tabor Rd., Philadelphia, Pa.
RUGGLES-COLES ENGINEERING CORP'N, 120 Broadway, New York, N. Y...*p. 609*

—Clay
*AMERICAN BLOWER CO., Detroit, Mich. *p. 553*
Colorado Iron Works Co., Denver, Colo.
*FULLER-LEHIGH CO., Fullerton, Pa...*p. 128*
PHILADELPHIA DRYING MACHINERY CO. (''Hurricane''), 3351 Stokeley St., Philadelphia, Pa...*p. 610*
Proctor & Schwartz (Inc.), 7th & Tabor Rd., Philadelphia, Pa.
RUGGLES-COLES ENGINEERING CORP'N, 120 Broadway, New York, N. Y...*p. 609*
STEACY-SCHMIDT MFG. CO., York, Pa...*p. 612*

—Cloth
*AMERICAN BLOWER CO., Detroit, Mich. *p. 553*
NEWBURGH STEAM BOILER WORKS (P. Delany & Co.), Newburgh, N. Y...*p. 64*
PHILADELPHIA DRYING MACHINERY CO. (''Hurricane''), 3351 Stokeley St., Philadelphia, Pa...*p. 610*
Proctor & Schwartz (Inc.), 7th & Tabor Rd., Philadelphia, Pa.

—Coal
Buckeye Dryer Co. (Inc.), 243 N. High St., Columbus, Ohio
*FULLER-LEHIGH CO., Fullerton, Pa...*p. 128*
RUGGLES-COLES ENGINEERING CORP'N, 120 Broadway, New York, N. Y...*p. 609*

—Fibre Board
PHILADELPHIA DRYING MACHINERY CO. (''Hurricane''), 3351 Stokeley St., Philadelphia, Po...*p. 610*

—Fertilizer
*FULLER-LEHIGH CO., Fullerton, Pa...*p. 128*
RUGGLES-COLES ENGINEERING CORP'N, 120 Broadway, New York, N. Y...*p. 609*

—Fruit and Vegetable
*AMERICAN BLOWER CO., Detroit, Mich. *p. 553*
DRYING SYSTEMS (Inc.) (Greef,'' ''Wenborne Karpen''), 11 S. Desplaines St., Chicago, Ill...*pp. 618, 619*
GALLAND-HENNING MFG. CO., Milwaukee, Wis...*p. 592*
Hammond Heating Co., 110 E. 2nd St., Cincinnati, Ohio
PHILADELPHIA DRYING MACHINERY CO. (''Hurricane''), 3351 Stokeley St., Philadelphia, Pa...*p. 610*
Schwab, Gustav, 525 Market St., San Francisco, Cal.

—Japaning
*AMERICAN BLOWER CO., Detroit, Mich. *p. 553*
*CARRIER ENGINEERING CORP'N, 39 Cortlandt St., New York, N. Y...*p. 620*

—Leather
*AMERICAN BLOWER CO., Detroit, Mich. *p. 553*

Digitized by Google

DRYING SYSTEMS (Inc.), (''Greef,'' ''Wenborne Karpen''), 11 S. Desplaines St., Chicago, Ill...*p. 618, 619*
PHILADELPHIA DRYING MACHINERY CO. (''Hurricane''), 3351 Stokeley St., Philadelphia, Pa...*p. 610*
Proctor & Schwartz (Inc.), 7th & Tabor Rd., Philadelphia, Pa.

—Lumber
*AMERICAN BLOWER CO., Detroit, Mich. ..*p. 553*
Curtis Hosey Dryer Co. (''Thermo-Myst''), 2220 Chestnut St., Philadelphia, Pa.
Drying Systems (Inc.), ''Greef,'' ''Wenborne Karpen''), 11 S. Desplaines St., Chicago, Ill...*pp. 618, 619*
National Dry Kiln Co., 1118-1226 East Maryland St., Indianapolis, Ind.
Perkins, Elmer E. Co., Wrigley Bldg., Chicago, Ill.

—Meal
LOUISVILLE DRYING MACHINERY CO., Louisville, Ky...*p. 608*
RUGGLES-COLES ENGINEERING CORP'N, 120 Broadway, New York, N. Y...*p. 609*
WELLER MFG. CO., 1820-1856 N. Kostner Ave., Chicago, Ill...*p. 381*

—Porcelain
PHILADELPHIA DRYING MACHINERY CO. (''Hurricane''), 3351 Stokeley St., Philadelphia, Pa...*p. 610*

—Pulp
*AMERICAN BLOWER CO., Detroit, Mich... *p. 553*
LOUISVILLE DRYING MACHINERY CO., Louisville, Ky...*p. 608*
RUGGLES-COLES ENGINEERING CORP'N, 120 Broadway, New York, N. Y...*p. 609*

—Raw Stock
PHILADELPHIA DRYING MACHINERY CO. (''Hurricane''), 3351 Stokeley St., Philadelphia, Pa...*p. 610*
Proctor & Schwartz, Inc., 7th & Tabor Road Philadelphia, Pa.
STEACY-SCHMIDT MFG. CO., York, Pa... *p. 612*

—Rotary
American Process Co., 68 William St., New York, N. Y.
BARTLETT, C. O. & SNOW CO., Cleveland, Ohio...*p. 367*
BONNOT CO., Canton, Ohio...*p. 598*
Buckeye Dryer Co., Inc., 243 No. High St., Columbus, Ohio
Cummer, F. D. & Son Co. (''Cummer''), 1152 Hanna Bldg., Cleveland, Ohio
Duff Patents Co., Inc., 918 Frick Bldg., Pittsburgh, Pa.
*FULLER-LEHIGH CO., Fullerton, Pa... *p. 128*
GALLAND-HENNING MFG. CO., Milwaukee, Wis...*p. 592*
Grupe Drier & Boiler Co., 325-331 E. Second St., Davenport, Ia.
Hersey Mfg. Co., South Boston, Mass.
LANCASTER IRON WORKS, (Inc.), Lancaster, Pa...*pp. 656, 657*
LASKER IRON WORKS, 3201 So. Lincoln St., Chicago, Ill...*p. 655*
LEBANON BOILER WORKS (J. K. Petty & Co., Inc.), 6 So. 15th St., Philadelphia, Pa...*pp. 78, 79*
LOUISVILLE DRYING MACHINERY CO., Louisville, Ky...*p. 608*
Mashek Engineering Co., 90 West St., New York, N. Y.
RUGGLES-COLES ENGINEERING CORP'N, 120 Broadway, New York, N. Y...*p. 609*
UNION ENGINEERING CO., Cleveland, O... *p. 645*
WELLER MFG. CO., 1820-1856 N. Kostner Ave., Chicago, Ill...*p. 381*

—Rubber
*CARRIER ENGINEERING CORP'N, 39 Cortlandt St., New York, N. Y. *p. 620*
DRYING SYSTEMS (Inc.), (''Greef'' ''Wenborne Karpen''), 11 S. Desplaines St., Chicago, Ill...*pp. 618, 619*
PHILADELPHIA DRYING MACHINERY CO. (''Hurricane''), 3351 Stokeley St., Philadelphia, Pa...*p. 610*
LASKER IRON WORKS, 3201 So. Lincoln St., Chicago, Ill...*p. 655*

—Sand
BARTLETT, C. O. & SNOW CO., Cleveland, Ohio...*p. 367*
CONNERY & CO. (Inc.), 2nd & Luzerne Sts., Philadelphia, Pa...*p. 651*
LASKER IRON WORKS, 3201 So Lincoln St, Chicago, Ill...*p. 655*
*PANGBORN CORP'N, P. O. Box 859, Hagerstown, Md...*pp. 636, 637*
Robertson, Wm. & Co. (''Robertson''), 20 W. Jackson Blvd., Chicago, Ill.
RUGGLES-COLES ENGINEERING CORP'N, 120 Broadway, New York, N. Y...*p. 609*
STEACY-SCHMIDT MFG. CO., York, Pa. ..*p. 612*

—Shell (Steam Jacketed)
NEWBURGH STEAM BOILER WORKS. (P. Delany & Co.), Newburgh, N. Y...*p. 64*
Perrin, William R. & Co., Room 504, 343 So. Dearborn St., Chicago, Ill.
RUGGLES-COLES ENGINEERING CORP'N, 120 Broadway, New York, N. Y...*p. 609*

—Spray
Kestner Evaporator Co., 18th & Alleghany Ave., Philadelphia, Pa.

—Textile
Proctor & Schwartz, Inc., 7th & Tabor Road, Philadelphia, Pa.

—Tobacco
PHILADELPHIA DRYING MACHINERY CO. (''Hurricane''), 3351 Stokeley St., Philadelphia, Pa. *p. 610*
Proctor & Schwartz, Inc., 7th & Tabor Road, Philadelphia, Pa.
RUGGLES-COLES ENGINEERING CORP'N, 120 Broadway, New York, N. Y...*p. 609*

—Vacuum
BARTLETT, C. O. & SNOW CO., Cleveland, Ohio...*p. 367*
Buffalo Foundry & Machine Co., 41 Winchester Ave., Buffalo, N. Y.
DEVINE, J. P. CO., 1375 Clinton St., Buffalo, N. Y...*pp. 606, 607*
KOVEN, L. O. & BROTHER, 154 Ogden Ave., Jersey City, N. J...*p. 605*

—Varnish
Perkins, Elmer E. Co., Wrigley Bldg., Chicago, Ill.

—Yarn
*AMERICAN BLOWER CO., Detroit, Mich... *p. 553*
PHILADELPHIA DRYING MACHINERY CO (''Hurricane''), 3351 Stokeley St., Philadelphia, Pa...*p. 610*
Proctor & Schwartz, Inc., 7th & Tabor Road, Philadelphia, Pa.

DRYING APPARATUS
*AMERICAN BLOWER CO., Detroit, Mich... *p. 553*
Anderson, V. D. Co., 1953 W. 96th St., Cleveland, Ohio
ATMOSPHERIC CONDITIONING CORP'N, 435 Chestnut St., Philadelphia, Pa...*p. 617*
BARTLETT, C. O. & SNOW CO., Cleveland, Ohio...*p. 367*
*CARRIER ENGINEERING, CORP'N. (''Carrier Ejector System''), 39 Cortland St., New York, N. Y...*p. 620*
Colorado Iron Works Co., Box 989, Denver, Colo.

Dr

Digitized by Google

Cutter, Geo. A., Taunton, Mass.
DRYING SYSTEMS (Inc.), 11 S. Desplaines St., Chicago, Ill...*pp. 618, 619*
GALLAND-HENNING MFG. CO., Milwaukee, Wis...*p. 592*
Gordon Engineering Corp'n, 39 Cortlandt St., New York, N. Y.
Hun, A. Berry Fan Co. (The), 28 Binford St., Boston, Mass.
LOUISVILLE DRYING MACHINERY CO., Louisville, Ky...*p. 608*
Merrill, C. J. (Inc.), 85 Kennebec St., Portland, Me.
NEW YORK BLOWER CO., Chicago, Ill...*p. 555*
Perkins, Elmer E. Co., Wrigley Bldg., Chicago, Ill.
PHILADELPHIA DRYING MACHINERY CO. ("Hurricane"), 3351 Stokeley St., Philadelphia, Pa...*p. 610*
Proctor & Schwartz, Inc., 7th & Tabor Road, Philadelphia, Pa.
RUGGLES-COLES ENGINEERING CORP'N, 120 Broadway, New York, N. Y...*p. 609*
Seymour, J. M., Jr., 51-53 Lawrence St., Newark, N J.
SKINNER BROS. MFG. CO. (Inc.), 1400-1490 Vandevanter Ave., St. Louis, Mo...*p. 621*
Stearns-Roger Mfg. Co., 1718-1720 California St., Denver, Colo.
STURTEVANT, B. F. CO., Hyde Park, Boston, Mass...*p. 106*
SWENSON EVAPORATOR CO., 945 Monadnock Bldg., Chicago, Ill...*p. 611*

DUMBWAITERS
K. O. Elevator Mfg. Co., 2601-3-5-7 Madison Ave., Kansas City, Mo.
Marshall Bros. Co, 21st & Mary Sts., South Side, Pittsburgh, Pa.
*SEDGWICK MACHINE WORKS, 146 W. 15th St., New York, N. Y...*p. 407*
Speidel, J. G., Reading, Pa.
Standard Electric & Elev Co., 123 S. Calvert St., Baltimore, Md.
Storm Mfg. Co., 50 Vesey St., Newark, N. J.

—Electric
Bates Elevator Co., 211 President St., Baltimore, Md.
Elevator Supplies Co. (Inc.), 1515 Willow Ave., Hoboken, N. J.
Marshall Bros. Co., 21st & Mary Sts., South Side, Pittsburgh, Pa.
Roberts, James H. Elevator Co., 430 W. Broadway, New York, N. Y.
See, A. B. Electric Elevator Co., 220 Broadway, New York, N. Y.
Storm Mfg. Co., 50 Vesey St., Newark, N. J.
Warner Elevator Mfg. Co., 2600 Spring St., Cincinnati, Ohio

DUMP CARS
(See Cars, Dump)

DUST COLLECTING SYSTEMS
*ALLIS-CHALMERS MFG. CO., Milwaukee, Wis...*pp. 28, 29*
ATMOSPHERIC CONDITIONING CORP'N, 435 Chestnut St., Philadelphia, Pa...*p. 617*
Carlisle & Gale Co., 5 North St., East Cambridge, Mass.
Clark Dust Collecting Co., Fisher Bldg., Chicago, Ill.
Cleveland Blow Pipe & Mfg. Co., 6950 Kinsman Road, Cleveland, Ohio
Dixie Mfg. Co., Inc., Russell St. & B. & O. R. R., Baltimore, Md.
Hoevel Mfg. Corp'n, 154 Ogden Ave., Jersey City, N. J.
Industrial Air Engineering Co., 310-311 Perry Payne Bldg., Cleveland, Ohio
Meadon's Blower & Pipe Works, 23-27 Meserole Ave., Brooklyn, N. Y.
Merrill, C. J. (Inc.), 85 Kennebec St., Portland, Me
Northern Blower Co., West 65th & Dennison Ave., Cleveland, Ohio
*PANGBORN CORP'N, P. O. Box 859, Hagerstown, Md...*pp. 636, 637*
SKINNER BROS. MFG. CO. (Inc.), 1400-1490 Vandevanter Ave., St. Louis, Mo...*p. 621*
*STURTEVANT, B. F. CO., Hyde Park, Boston, Mass...*p. 106*

DUST COLLECTORS
*ALLIS-CHALMERS MFG. CO., Milwaukee, Wis...*pp. 28, 29*
Carlisle & Gale Co., 5 North St., East Cambridge, Mass.
Clark Dust Collecting Co., Fisher Bldg., Chicago, Ill.
Cyclone Blow Pipe Co., 2552 W. 21st St., Chicago, Ill.
Dixie Mfg. Co. (Inc.), Russell St. & B. O. R R., Baltimore, Md
Hersh Brothers Co ("Lehigh"), Allentown, Pa.
Hoevel Mfg. Corp'n, 154 Ogden Ave., Jersey City, N. J.
Holly Pneumatic Systems (Inc.), 145 West 45th St., New York, N. Y.
Industrial Air Engineering Co., 310-311 Perry Payne Bldg., Cleveland, Ohio
Kirk & Blum Mfg. Co., Cincinnati, Ohio
Knickerbocker Co., Jackson, Mich.
Meadon's Blower & Pipe Works, 23-27 Meserole Ave., Brooklyn, N. Y.
*PANGBORN CORP'N, Hagerstown, Md...*pp. 636, 637*
Paxson, J. W. Co., 1021 N. Delaware Ave., Philadelphia, Pa.
SKINNER BROS. MFG CO. (Inc), 1440-1490 Vandevanter Ave., St. Louis, Mo...*p. 621*
Sly, W. W. Mfg. Co., Cleveland, Ohio
*STURTEVANT, B. F. CO., Hyde Park, Boston, Mass..*p. 106*

—Cloth
Illinois Mfg. & Supply Co., Quincy, Ill.
*PANGBORN CORP'N, P. O. Box 859, Hagerstown, Md...*pp. 636, 637*
Stroud, E. H. & Co., 928-934 Fullerton Ave., Chicago, Ill.

—Metal
*ALLINGTON & CURTIS MFG. CO., Saginaw, Mich...*p. 554*
Cleveland Blow Pipe & Mfg. Co., 6950 Kinsman Road, Cleveland, Ohio
*PANGBORN CORP'N, P. O. Box 859, Hagerstown, Md...*pp. 636, 637*
Northern Blower Co., West 65th & Dennison Ave., Cleveland, Ohio
Stroud, E. H. & Co., 928-934 Fullerton Ave., Chicago, Ill.

DUST DETERMINATORS
ATMOSPHERIC CONDITIONING CORP'N, 435 Chestnut St., Philadelphia, Pa...*p. 617*
Precision Scientific Co., 820-822 S. Tripp Ave., Chicago, Ill.

DYEING MACHINERY
PHILADELPHIA DRYING MACHINERY CO., 3351 Stokeley St., Philadelphia, Pa. *p. 610*

DYNAMOMETERS
Chatillon, John & Sons, 85-93 Cliff St., New York, N. Y.
Sprague Electric Works, 527 W. 34th St., New York, N. Y.
Standard Motor Construction Co., 172 Whiton St., Jersey City, N. J.
*WESTINGHOUSE ELECTRIC & MFG. CO., East Pittsburgh, Pa...*pp. 160, 161*

—Railway
Burr Co., Champaign, Ill.

Digitized by Google

—Tractor
Burr Co., Champaign, Ill.

DYNAMOS
(See Generators, Electric)

E

ECONOMIZERS, FUEL
*GREEN FUEL ECONOMIZER CO., Beacon, N. Y...*pp. 96, 97*
Power Specialty Co. (''Foster''), 111 Broadway, New York, N. Y.
Scharf Smoke Preventer Co., 126 N. Adams St., Ypsilanti, Mich.
STURTEVANT, B. F. CO., Hyde Park, Boston, Mass...*p. 106*

EJECTORS
AMERICAN INJECTOR CO., Detroit, Mich. *p. 217*
Hayden & Derby Mfg. Co., 119 W. 40th St., New York, N. Y.
*LUNKENHEIMER CO., Cincinnati, Ohio.. *pp. 184, 185, 186, 187, 188, 189*
Penberthy Injector Co., 1242 Holden Ave., Detroit, Mich.
*SCHUTTE & KOERTING CO., 1184 Thompson St., Philadelphia, Pa...*p. 159*
Tranter Mfg. Co., 105 Water St., Pittsburgh, Pa.

—Ash (Hydraulic)
Great Lakes Engineering Works, River Rouge, Mich.

—Sewage
Latta-Martin Pump Co., Hickory, N. C.

—Sewage (Centrifugal)
Simplex Ejector Co., 1050 Randolph St., Chicago, Ill.
YEOMANS BROS. CO., 1426 Dayton St., Chicago, Ill...*p. 584*

—Sewage (Pneumatic)
Blackburn-Smith Corp'n, 105 W. 40th St., New York, N. Y.
Pacific Flush Tank Co., 149 Broadway, New York, N. Y.
Simplex Ejector Co., 1050 Randolph St., Chicago, Ill.
YEOMANS BROS. CO., (''Shons''), 1426 Dayton St., Chicago, Ill. *p. 584*

—Soot
United Conveyor Corp'n, 1500 Old Colony Bldg., Chicago, Ill.

ELBOWS

—Conduit
American Tube & Pipe Bending Co., 880 East 72nd St., Cleveland, Ohio

—Union
Bard Union Co. (Inc.), Norwich, Conn.
*CRANE CO., 836 S. Michigan Ave., Chicago, Ill...*pp. 170, 171, 172, 173*
KELLY & JONES CO., Greensburg, Pa...*pp. 182, 183*
MALLEABLE IRON FITTINGS CO., Branford, Conn...*p. 236*

ELECTRIC FURNACES, GENERATORS, HOISTS, TRUCKS, WELDING, ETC.
(See Furnaces, Generators, Hoists, Trucks, Welding, etc., Electric)

ELECTRIC MACHINERY
*ALLIS-CHALMERS MFG. CO., Milwaukee, Wis...*pp. 28, 29*
Electric Machinery Mfg. Co., Minneapolis, Minn.
*GENERAL ELECTRIC CO., Schenectady, N. Y...*pp. 18, 19, 20, 21*
General Vehicle Co. (Inc.), Long Island City, N. Y.
Ideal Electric & Mfg. Co., Mansfield, Ohio
Maintenance Co. (Inc.), 449-53 W. 42d St., New York, N. Y.
Mechanical Appliance Co., Milwaukee, Wis.
National Screw & Tack Co., 2440 E. 75th St., AB Products Division, Cleveland, Ohio
Roth Bros. & Co., 1400 W. Adams St., Chicago, Ill.
*WESTINGHOUSE ELECTRIC & MFG. CO., East Pittsburgh, Pa...*pp. 160, 161*
Winkler Ice Machine Co., 1752 N. 29th St., Philadelphia, Pa.

ELECTRIC MEASURING INSTRUMENTS
(See Instruments, Electrical Measuring)

ELECTRIC SPECIALTIES
Carleton-Mace Engine Corp'n, 18 Tremont St., Boston, Mass.
Hubbell, Harvey (Inc.), State St. & Bostwick Ave., Bridgeport, Conn.

ELECTRIC SUPPLIES
Benjamin Electric Mfg. Co., 806 W. Washington Blvd., Chicago, Ill.
National Screw & Lock Co., 2440 E. 75th St. A B Products Division, Cleveland, Ohio
Creaghead Engineering Co., 340-342 Main St., Cincinnati, Ohio
*GENERAL ELECTRIC CO., Schenectady, N. Y...*pp. 18, 19, 20, 21*
*JOHNS-MANVILLE (Inc.), New York, N. Y...*p. 244*
Maintenance Co. (Inc.), 449-53 W. 42nd st., New York, N. Y.
Risdon Mfg. Co., Naugatuck, Conn.
Waterbury Battery Co., Waterbury, Conn.
*WESTINGHOUSE ELECTRIC & MFG. CO., East Pittsburgh, Pa...*pp. 160, 161*

ELECTRIC TESTING APPARATUS
BIDDLE, JAMES G., 1211-1213 Arch St., Philadelphia, Pa...*p. 298*
BROWN INSTRUMENT CO. (''Brown''), Philadelphia, Pa...*p. 292*
*GENERAL ELECTRIC CO., Schenectady, N. Y...*pp. 18, 19, 20, 21*
Leeds & Northrup Co., 4901 Stenton Ave., Philadelphia, Pa.
*WESTINGHOUSE ELECTRIC & MFG. CO., East Pittsburgh, Pa...*pp. 160, 161*
Weston Electrical Instrument Co., Waverly Park, Newark, N. J.

ELECTRODES
Acheson Graphite Co., Niagara Falls, N. Y.

—Arc Welding
QUASI-ARC WELDTRODE CO. (Inc.), (''Quasi-Arc''), 114 Hudson Ave., Peekskill, N. Y...*p. 538*
WILSON WELDER & METALS CO. (Inc.), 259 36th St., Brooklyn, N. Y...*p. 537*

ELECTROTYPING MACHINERY
Hoe, R. & Co., 504-520 Grand St., New York, N. Y.

ELEVATING AND CONVEYING MACHINERY
*ALLIS-CHALMERS MFG. CO., Milwaukee, Wis...*pp. 28, 29*
Alvey-Ferguson Co., 75 North Ave., Oakley, Cincinnati, Ohio
AMERICAN TOOL & MACHINE CO., Boston 9, Mass...*p. 614*
BARTLETT, C. O. & SNOW CO., Cleveland, Ohio...*p. 367*
*CALDWELL, H. W. & SON CO., 17th St. & Western Ave., Chicago, Ill...*p. 370*
Chain Belt Co., Milwaukee, Wis.
Chicago Automatic Conveyor Co., 11 So. La Salle St., Chicago, Ill.
Conant Machine Co., Concord Junction, Mass.
Dull, Raymond W. Co., 111 W. Washington St., Chicago, Ill.
*GIFFORD-WOOD CO., Hudson, N. Y...*p. 372*
Guendler Patent Crusher & Pulverizer Co., 928 N. First St., St. Louis, Mo.
Heyl & Patterson, Inc., 51 Water St., Pittsburgh, Pa.

Digitized by Google

Howe Chain Co., 104 East Clay Ave., Muskegon, Mich.
HUNT, C. W. CO. (Inc.), West New Brighton, Staten Island, N. Y...*pp. 374, 375*
JEFFREY MFG. CO., 904 N. 4th St., Columbus, Ohio...*pp. 376, 377*
*JONES, W. A. FOUNDRY & MACHINE CO., 4415 West Roosevelt Road, Chicago, Ill...*pp. 312, 313, 314, 315*
LAMSON CO., 100 Boyleston St., Boston, Mass *pp. 378, 379*
Mathews Gravity Carrier Co., Ellwood City, Pa.
Meese & Gottfried Co., 660 Mission St., San Francisco Cal.
Moore, George W. Co., 2144 Fulton St., Chicago. Ill.
MORRIS, HERBERT (Inc.), 1-15 Lawrence Place, Buffalo, N. Y...*p. 402*
Olson, Samuel & Co., 2418-22 Bloomingdale Ave., Chicago, Ill.
*PANGBORN CORP'N, P. O. Box 859, Hagerstown, Md...*pp. 636, 637*
PHILADELPHIA DRYING MACHINERY CO., 3351 Stokeley St., Philadelphia, Pa. ..*p. 610*
ROBINS CONVEYING BELT CO., Park Row Bldg., New York, N. Y...*p. 373*
Scottdale Machine & Mfg. Co., Scottdale, Pa.
*SEDGWICK MACHINE WORKS, 146 W. 15th St., New York, N. Y...*p. 407*
Specialty Engineering Co., Allegheny & Trenton Ave., Philadelphia, Pa.
STANDARD CONVEYOR CO., North St. Paul, Minn...*p 380*
Stephens-Adamson Mfg Co., Aurora, Ill.
STURTEVANT MILL CO., Harrison Sq., Boston 22, Mass...*pp. 600, 601*
Underwood Machinery Co., 110-120 Mt. Vernon St., South Boston, Mass.
UNION ENGINEERING CO., Cleveland. O... *p. 645*
Union Iron Works, 600 E. William St., Decatur, Ill.
WELLER MFG. CO., 1820-1856 N. Kostner Ave., Chicago, Ill...*pp. 381, 422*

ELEVATING TRUCKS
(See Trucks, Elevating)

ELEVATOR APPLIANCES
Elevator Supplies Co. (Inc.), 1515 Willow Ave., Hoboken, N. J.
Maintenance Co. (Inc.), 449-53 W. 42nd St., New York, N. Y.
*WESTINGHOUSE ELECTRIC & MFG. CO., East Pittsburgh, Pa...*pp. 160, 161*
Wheeler-McDowell Elevator Co., 417-421 Canal St., New York, N. Y.

ELEVATOR CABLE
Macwhyte Co. ("Macwhyte"), Kenosha, Wis.
*ROEBLING'S, JOHN A. SONS CO., Trenton, N. J...*p. 409*

ELEVATOR CABS AND ENCLOSURES
Cincinnati Mfg. Co., Cincinnati, Ohio
K. C. Elevator Mfg. Co., 2601 Madison Ave., Kansas City, Mo.
Kamman, Walter Mfg. Co., 3264 Spring Grove Ave., Cincinnati, Ohio
Ohio Elevator & Machine Co., Columbus, O.

ELEVATOR GUIDES
Standard Gauge Steel Co., Beaver Falls, Pa.
*UNION DRAWN STEEL CO., Beaver Falls, Pa...*p. 423*

ELEVATORS

—Automobile
K. C. Elevator Mfg. Co., 2601-3-5-7 Madison Ave., Kansas City, Mo.
*SEDGWICK MACHINE WORKS, 146 W 15th St., New York, N. Y... *p. 407*
Warner Elevator Mfg. Co., 2600 Spring Grove Ave., Cincinnati, Ohio

—Belt Driven
Moffatt Machinery Mfg. Co., Charlotte, N. C.
Reedy, H. J. Co., Cincinnati, O.
Salem Elevator Works, 244 Canal St., Salem, Mass.

—Bucket and Chain
JEFFREY MFG. CO., 904 N. 4th St., Columbus, Ohio...*pp. 376, 377*
*JONES, W. A. FOUNDRY & MACHINE CO., 4415 West Roosevelt Road, Chicago, Ill...*pp. 312, 313, 314, 315*
ROBINS CONVEYING BELT CO., Park Row Bldg., New York, N. Y...*p. 373*
STANDARD SAND & MACHINE CO., 5151 St. Clair Ave., Cleveland, Ohio...*p. 635*
WELLER MFG. CO., 1820-1856 N. Kostner Ave., Chicago, Ill...*p. 381*
WILLCOX ENGINEERING CO., Saginaw, Mich...*pp. 272, 613*

—Counterweight
*SEDGWICK MACHINE WORKS ("Sedgwick"), 146 W. 15th St., New York, N. Y. ..*p. 407*

—Electric
Albro-Clem Elevator Co., Erie Ave. & D St., Philadelphia, Pa.
American Elevator & Machine Co., Louisville, Ky.
Bates Elevator Co., 211 President St., Baltimore, Md.
Curran, James H. Elevator Co., 114 W. Second St., Cincinnati, O.
General Elevator Co., 29 Broadway, New York, N. Y.
Gurney Elevator Co., Honesdale, Pa.
Haughton Elevator & Machine Co., 671-693 Spencer St., Toledo, O.
K. C. Elevator Mfg. Co., 2601-3-5-7 Madison Ave., Kansas City, Mo.
Kieckhefer, A. Elevator Co., 1026-1104 St. Paul Ave., Milwaukee, Wis.
Kimball Bros. Co., Council Bluffs, Ia.
LAMSON CO., 100 Boyleston St., Boston, Mass...*pp. 378, 379*
McLaughlin, Geo. T. Co., 120 Fulton St., Boston, Mass.
Moore & Wyman Elevator & Machine Works, 72 Granite St., Boston, Mass.
Reedy, H. J. Co., Cincinnati, Ohio
Roberts, James H. Elevator Co., 430 W. Broadway, New York N. Y.
Salem Elevator Works, 244 Canal St., Salem, Mass.
See, A. B. Electric Elevator Co., 220 Broadway, New York, N. Y.
Sidney Elevator Mfg. Co., Sidney, Ohio
Speidel, J. G., Reading, Pa.
Warner Elevator Mfg. Co., 2600 Spring Grove Ave., Cincinnati, Ohio
Watson Elevator Co., 407 W. 36th St., New York, N. Y.
Wheeler-McDowell Elevator Co., 417-421 Canal St., New York.

—Freight
Albro-Clem Elevator Co., Erie Ave. & D. St., Philadelphia, Pa.
American Elevator & Machine Co., Louisville, Ky.
Baker Iron Works, 950 N. Broadway, Los Angeles, Cal.
Curran, James H. Elevator Co., 114 W. Second St., Cincinnati, Ohio
Eastern Machinery Co., New Haven, Conn.
General Elevator Co., 29 Broadway, New York, N. Y.
Gurney Elevator Co., Honesdale, Pa.
Haughton Elevator & Machine Co., 671-693 Spencer St., Toledo, Ohio
K. C. Elevator Co., 2601-3-5-7 Madison Ave., Kansas City, Mo.
Kieckhefer, A. Elevator Co., 1026-1104 St. Paul Ave., Milwaukee, Wis.

Digitized by Google

Kimball Bros. Co., Council Bluffs, Ia.
Mason, Volney W. & Co. (Inc.), 2 Lafayette St., Providence, R. I.
McLauthlin, Geo. T. Co., 120 Fulton St., Boston, Mass.
Moore & Wyman Elevator & Machine Works, 72 Granite St., Boston, Mass.
Ohio Elevator & Machine Co., Columbus, Ohio
Otis Elevator Co., 11th Ave. & 26th St., New York, N. Y.
Park Mfg. Co., Charlotte, N. C.
Reedy, H. J. Co., Cincinnati, Ohio
Ridgway, Craig & Son Co. (''Hook'er to the Biler''), Coatesville, Pa.
Salem Elevator Works, 244 Canal St., Salem, Mass.
*SEDGWICK MACHINE WORKS, 146 W. 15th St., New York, N. Y...*p. 407*
See, A. B. Electric Elevator Co., 220 Broadway, New York, N. Y.
Sidney Elevator Mfg. Co., Sidney, Ohio
Speidel, J. G., Reading, Pa.
Standard Plunger Elevator Co., 243 Stafford St., Worcester, Mass.
Storm Mfg. Co., 50 Vesey St., Newark, N. J.
Warner Elevator Mfg. Co., 2600 Spring Grove Ave., Cincinnati, Ohio
Watson Elevator Co., 407 W. 36th St., New York, N. Y.
Westbrook Elevator Mfg. Co. (Inc.), Danville, Va.
Wheeler-McDowell Elevator Co., 417-421 Canal St., New York, N. Y.

—Hand Power
Bates Elevator Co., 211 President St., Baltimore, Md.
Curran, James H. Elevator Co., 114 W. Second St., Cincinnati, O.
K. C. Elevator Mfg. Co., 2601-3-5-7 Madison Ave., Kansas City, Mo.
Kimball Bros. Co., Council Bluffs, Ia.
LAMSON CO., 100 Boyleston St., Boston, Mass...*pp. 378, 379*
Lowerator Co. (Inc.), 110 W. 40th St., New York, N. Y.
*SEDGWICK MACHINE WORKS, 146 W. 15th St., New York, N. Y...*p. 407*
Sidney Elevator Mfg. Co., Sidney, Ohio.
Speidel, J. G., Reading, Pa.
Warner Elevator Mfg. Co., 2600 Spring Grove Ave., Cincinnati, Ohio

—Hydraulic
Harris Ice Machine Works, 174 E. Water St., Portland, Ore.
Haughton Elevator & Machine Co., 671-693 Spencer St., Toledo, Ohio
K. C. Elevator Mfg. Co., 2601-3-5-7 Madison Ave., Kansas City, Mo.
Reedy, H. J. Co., Cincinnati, O.
*WASHBURN & GRANGER (Inc.), 50 Church St., New York, N. Y...*p. 127*

—Hydraulic Plunger
General Elevator Co., 29 Broadway, New York, N. Y.
Kieckhefer, A., Elevator Co., 1025-1104 St. Paul Ave., Milwaukee, Wis.

—Inclined
BARTLETT, C. O. & SNOW CO., Cleveland, Ohio...*p. 367*
*CALDWELL, H. W. & SON CO., 17th St. & Western Ave., Chicago, Ill...*p. 370*
Dow Co. (Inc.), Lousville, Ky.
JEFFREY MFG. CO., 904 N. 4th St., Columbus, Ohio...*pp. 376, 377*
LAMSON CO., 100 Boyleston St., Boston, Mass...*pp. 378, 379*
McKinney-Harrington Co., Marquette St., North Chicago, Ill.
Otis Elevator Co., 11th Ave. & 26th St., New York, N. Y.
STANDARD CONVEYOR CO., North St. Paul, Minn...*p. 380*
STURTEVANT MILL CO., Harrison Sq., Boston (22), Mass...*pp. 600, 601*
WELLER MFG. CO., 1820-1856 N. Kostner Ave., Chicago, Ill...*p. 381*

—Portable
Economy Engineering Co., 415 S. Washtenaw Ave., Chicago, Ill.
JEFFREY MFG. CO., 904 N. 4th St., Columbus, Ohio...*pp. 376, 377*
McKinney-Harrington Co., Marquette St., North Chicago, Ill.
NEW JERSEY FOUNDRY & MACHINE CO., 90 West Street, New York, N. Y...*p. 396*
Revolvator Co., 344 Garfield Ave., Jersey City, N. J.
Robbins Engineering Co., Old Colony Bldg., Chicago, Ill.
Specialty Engineering Co., Allegheny & Trenton Aves., Philadelphia, Pa.

—Sidewalk
Ernst, Chas. K., 1001 Ferry St., Buffalo, N. Y.
*SEDGWICK MACHINE WORKS, 146 W. 15th St., New York, N. Y...*p. 407*
Watson Elevator Co., 407 W. 36th St., New York, N. Y.

—Steam Hydraulic
Ridgway, Craig & Son Co., Coatesville, Pa.

—Straight Lift
STANDARD CONVEYOR CO., North St. Paul, Minn...*p. 380*

—Telescopic
American Machinery Co., 103 W. Water St., Milwaukee, Wis.
BARTLETT, C. O. & SNOW CO., Cleveland, Ohio...*p. 367*
WELLER MFG. CO., 1820-1856 N. Kostner Ave., Chicago, Ill...*p. 381*

—Traction
McLauthlin, Geo. T. Co., 120 Fulton St., Boston, Mass.
Reedy, H. J. Co., Cincinnati, Ohio
Warner Elevator Mfg. Co., 2600 Spring Grove Ave., Cincinnati, Ohio

EMERY WHEELS
(See Grinding Wheels)

ENAMELING (Porcelain)
GEUDER, PAESCHKE & FREY CO., Western Valley, Milwaukee, Wis...*p. 434*
Wheeler Reflector Co., 156 Pearl St., Boston, Mass.

ENGINE STANDS (Automobile Overhaul)
Manley Mfg. Co., York, Pa.

ENGINE STARTERS
Air Device Mfg. Co. (''Ten Eyck''), 2977 Cottage Grove Ave., Chicago, Ill.

ENGINE STOPS
Consolidated Engine Stop Co., 133 West 19th St., New York, N. Y.
*CRANE CO., 836 S. Michigan Ave., Chicago, Ill...*pp. 170, 171, 172, 173*
Jenkins Machine Co. (''Falls''), Sheboygan, Wis.
Locke Regulator Co., 76 North St., Salem, Mass.
*SCHUTTE & KOERTING CO., 1184 Thompson St., Philadelphia, Pa...*p. 159*
Strong, Carlisle & Hammond Co., Cleveland, Ohio

ENGINEERS' SUPPLIES
*CRANE CO., 836 S. Michigan Ave., Chicago, Ill...*pp. 170, 171, 172, 173*
G. E. Engineering Co. (Inc.), 22 Laight St., New York, N. Y.
*GREENE, TWEED & CO., 109 Duane St., New York, N. Y...*p. 250*
*LUNKENHEIMER CO., Cincinnati, Ohio...*pp. 184, 185, 186, 187, 188, 189*

Digitized by Google

Maintenance Co. (Inc.), 449-53 W. 42nd St., New York, N. Y.
Somers, Fitler & Todd Co., 327 Water St., Pittsburgh, Pa.

ENGINES

—Alcohol
Wolverine Motor Works, Bridgeport, Conn.

—Blowing
*ALLIS-CHALMERS MFG. CO., Milwaukee, Wis...*pp. 28, 29*
*DE LAVAL STEAM TURBINE CO., Trenton, N. J...*p. 22*
HOOVEN, OWENS, RENTSCHLER CO., Hamilton, Ohio...*pp. 10*
Mesta Machine Co., Box 1124, Pittsburgh, Pa.
NORDBERG MFG. CO., Milwaukee, Wis...*p. 11*
Weimer Machine Works Co., Lebanon, Pa.
*WORTHINGTON PUMP & MACHINERY CORPN., 115 Broadway, New York, N. Y. ..*pp. 44, 45, 46, 47*

—Compressed Air
Detroit Hoist & Machine Co., 8201 Morrow St., Detroit, Mich.

—Distillate
Angola Gas Engine Co., Angola, Ind.
FAIRBANKS, MORSE & CO., 900 S. Wabash Ave., Chicago, Ill...*p. 41*
TITUSVILLE IRON WORKS CO. (''Tico''), Titusville, Pa...*p. 89*
Wolverine Motor Works, Bridgeport, Conn.

—Gas
Advance Mfg. Co. (''Hamilton''), Hamilton, Ohio
*ALLIS-CHALMERS MFG. CO., Milwaukee, Wis...*pp. 28, 29*
American Engine Co., 2nd & Amsterdam Ave., Detroit, Mich.
Angels Iron Works, Angels Camp, Cal.
Angola Gas Engine Co., Angola, Ind.
Augustine Automatic Rotary Engine Co., 1862 Elmwood Ave., Buffalo, N. Y.
Backus Water Motor Co., 172-182 Pennsylvania Ave., Newark, N. J.
Benninghofen, C. Sons, Hamilton, Ohio
Bessemer Gas Engine Co., Grove City, Pa.
Bruce-MacBeth Engine Co., Cleveland, Ohio
Buffalo Gasoline Motor Co., 1280 Niagara St., Buffalo, N. Y.
Butler Engine & Foundry Co., Butler, Pa.
Callahan, W. P. Co., Dayton, Ohio
CHICAGO PNEUMATIC TOOL CO. (''Giant''), 6 E. 44th St., New York, N. Y...*p. 548*
Clay Engine Mfg. Co., 6950 Kinsman Road, Cleveland, Ohio
Cook Motor Co., Delaware, Ohio
Cooper, C. & G. Co., Mt. Vernon, Ohio
Dissinger, C. H. A. & Bro. (Inc.), Wrightsville, Pa.
Du Bois Iron Works, 805 Brady Sts., Du Bois, Pa.
FAIRBANKS CO., 416 Broome St., New York, N. Y...*pp. 174, 175*
FAIRBANKS, MORSE & CO., 900 S. Wabash Ave., Chicago, Ill...*p. 41*
Foos Gas Engine Co., Springfield, Ohio
Franklin Valveless Engine Co., Franklin, Pa.
Galloway, Wm. Co., Waterloo, Iowa
HOOVEN, OWENS, RENTSCHLER CO., Hamilton, Ohio...*p. 10*
HOPE ENGINEERING & SUPPLY CO. (''Reeves''), Mt. Vernon, Ohio...*p. 49*
Jacobson Machine Mfg. Co., Warren, Pa.
Lazier Gas Engine Co., Buffalo, N. Y.
Lucey Mfg. Corpn., Woolworth Bldg., New York, N. Y.
Meriam Co., 8405 Detroit Ave., Cleveland, O.
Mesta Machine Co., Box 1124, Pittsburgh, Pa.
Middletown Machine Co. (''Woodpeckers''), Middletown, Ohio
Miller Improved Gas Engine Co., Springfield, Ohio
MILWAUKEE RELIANCE BOILER WORKS, Milwaukee, Wis...*p. 148*
NATIONAL SUPPLY CO. (''Superior''), Toledo, Ohio...*pp. 648, 649*
*NOVO ENGINE CO., Lansing, Mich...*pp. 586, 587*
Ohio Motor Co., Sandusky, Ohio
Olin Gas Engine Co., 10 Lock St., Buffalo, N. Y.
Oliver Mfg. Co., Fourth & Madison Sts., Oakland, Cal.
Oscillating Washer Co., Titusville, Pa.
Otto Engine Mfg. Co., 3215 Walnut Sts., Philadelphia, Pa.
Page Engineering Co., Foot Latrobe Park, Baltimore, Md.
Rathbun-Jones Engineering Co., Toledo, O.
Reeves Engineering Co., Trenton, N. J.
Rollins Engine Co., Nashua, N. H.
Southern Engine & Boiler Works, Jackson, Tenn.
Standard Gas Engine Co., East Oakland, Cal.
Superior Gas Engine Co., Springfield, Ohio
*TITUSVILLE IRON WORKS CO. (''J. C.'' ''Olin''), Titusville, Pa...*p. 89*
Turner-Fricke Mfg. Co., Pittsburgh, Pa.
Union Tool Co., Torrance, Cal.
United Engine Co., Lansing, Mich.
Witte Engine Works, 16th & Oakland Ave., Kansas City, Mo.
Wolverine Motor Works, Union Ave., Bridgeport, Conn.

—Gas, Natural
Bruce-MacBeth Engine Co., Cleveland, Ohio
HOPE ENGINEERING & SUPPLY CO. (''Reeves''), Mt. Vernon, Ohio...*p. 49*
Miller Improved Gas Engine Co., Springfield, Ohio
*NOVO ENGINE CO., Lansing, Mich...*p. 586, 587*
Reid, Joseph Gas Engine Co., Oil City, Pa.
Schenck Mfg. & Supply Co., Parkers Landing, Pa.
*TITUSVILLE IRON WORKS CO. (''J. C.'' ''Olin''), Titusville, Pa...*p. 89*

—Gas-Steam
HOOVEN, OWENS, RENTSCHLER CO., Hamilton, Ohio...*p. 10*

—Gasoline
Advance Mfg. Co. (''Hamilton''), Hamilton, Ohio
Aerothrust Engine Co., La Porte, Mo.
Alamo Engine Co., Hillsdale, Mich.
Anderson Engine Co., 4036 N. Rockwell St., Chicago, Ill.
Angola Gas Engine Co., Angola, Ind.
Associated Manufacturers Co., Waterloo, Ia.
Automatic Machine Co., Bridgeport, Conn.
Bauroth Brothers, Springfield, Ohio
Benninghofen, C. Sons, Hamilton, Ohio
Brownall Engine & Pulley Co., 12 W. 4th St., Holland, Mich.
Bryant Co., 1025 South Menard Ave., Chicago, Ill.
Buckeye Machine Co., Lima, Ohio
Burlingame, S. F., W. Boylston St., Worcester, Mass.
Callahan, W. P. Co., Dayton, Ohio
Central Iron Works, Stevens Point, Portage Co., Wis.
Charter Gas Engine Co., Sterling, Ill.
Clay Engine Mfg. Co., 6950 Kinsman Road, Cleveland, Ohio
Climax Engineering Co., Clinton, Ia.
Cook Motor Co., Delaware, Ohio
Domestic Engine & Pump Co., Shippenburg, Pa.
Du Bois Iron Works, 805 Brady St., Du Bois, Pa.
Evansville Gas Engine Works, 1280 Riverside Ave., Evansville, Ind.

Digitized by Google

Enterprise Machinery Co., 1601 8th St., S. E., Minneapolis, Minn.
Evansville Gas Engine Works, 1230 Riverside Ave., Evansville, Ind.
FAIRBANKS, MORSE & CO., 900 Wabash Ave., Chicago, Ill...*p. 41*
Fairmont Gas Engine & Railway Motor Car Co., North Main St., Fairmont, Minn.
Fay & Bowen Engine Co., Geneva, N. Y.
Field-Brundage Engine Works, Jackson, Mich.
Fuller & Johnson Mfg. Co., 1350 E. Washington Ave., Madison, Wis.
Gade Bros. Mfg. Co., Iowa Falls, Ia.
Gibbs Gas Engine Co., of Florida, 26 S. Main St., Jacksonville, Fla.
Gray & Prior Machine Co., 98 Suffield St., Hartford, Conn.
Hercules Motor Mfg. Co., Canton, Ohio
Hettinger Engine Co., Bridgetown, N. J.
Ideal Engine Co., Lansing, Mich.
International Cultivator Corpn., 34 Lake Drive, Oshkosh, Wis.
*JOHNSON, CARLYLE MACHINE CO., Manchester, Conn...*p. 332*
Kahlenberg Bros. Co., Two Rivers, Wis.
Lunt-Moss Co., 43 S. Market St., Boston, Mass.
McKeen Motor Car Co., 1222 Webster St., Omaha, Neb.
Myrick Machine Co., Olean, N. Y.
"New-Way" Motor Co., Lansing, Mich.
*NOVO ENGINE CO., Lansing, Mich...*pp. 586, 587*
Ohio Moto Co., Sandusky, Ohio
OLMSTEAD, A. E. & SONS, Pulaski, N. Y. ..*p. 50*
Otto Engine Mfg. Co., 3215 Walnut St., Philadelphia, Pa.
Ottumwa-Moline Engine & Pump Co., Ottumwa, Iowa
Pittsburgh Model Engine Co., Homewood, Pa.
Regal Gasoline Engine Co., Coldwater, Mich.
Reliance Engineering Co. ("Olds"), Lansing, Mich.
Rider-Ericsson Engine Co., 20 Murray St., New York, N. Y.
Root & Van Dervoort Engineering Co., East Moline, Ill.
Schramm, Chris D. & Son (Inc.), West Chester, Pa.
Standard Gas Engine Co., East Oakland, Cal.
Steiner, M. & Co., 242 Torrence St., Dayton, Ohio
Sterling Engine Co., 1252-1274 Niagara St., Buffalo, N. Y.
Stover Mfg. & Engine Co., Freeport, Ill.
STURTEVANT, B. F. CO., Ryde Park, Boston, Mass...*p. 106*
*TITUSVILLE IRON WORKS CO., Titusville, Pa...*p. 89*
Turner Mfg. Co., Port Washington, Wis.
Union Gas Engine Co,. Oakland, Cal.
Weber Engine Co., Kansas City, Mo.
Witte Engine Works, 16th & Oakland Ave., Kansas City, Mo.
Wolverine Motor Works, Bridgeport, Conn.
Wright Machine Co. (Inc.), ("Wright Reliable"), Owensboro, Ky.

—Haulage

Litchfield Foundry & Machine Co., Litchfield, Ill.

—Hoisting

*ALLIS-CHALMERS MFG. CO., Milwaukee, Wis...*pp. 28, 29*
AMERICAN HOIST & DERRICK CO., St. Paul, Minn...*p. 383*
Buffalo Contractors Plant Corpn., 129 Erie St., Buffalo, N. Y.
Buffalo Hoist & Derrick Co., 129 Erie St., Buffalo, N. Y.
Chase Machine Co., 2313 Elm St., N. W., Cleveland, Ohio
Clyde Iron Works Sales Co., 29th Ave. W. & Michigan St., Duluth, Minn.
CONNELLSVILLE MFG. & MINE SUPPLY CO., Connellsville, Pa...*p. 384*
Crawford & McCrimmon Co., Brazil, Ind.
Dake Engine Co., Grand Haven, Mich.
ELLICOTT MACHINE CORPN., Baltimore, Md...*p. 588*
Erie Hoist Co., 2101 Holland St., Erie, Pa.
Exeter Machine Works, West Pittston, Pa.
FAIRBANKS-MORSE & CO., 900 S. Wabash Ave., Chicago, Ill...*p. 41*
Flory, S. Mfg. Co., Bangor, Pa.
Hettinger Engine Co., Bridgetown, N. J.
HOLMES, ROBT. & BROS. (Inc.), Danville, Ill...*pp. 386, 387*
Hunt, C. W. Co. (Inc.), West New Brighton, Staten Island, N. Y...*pp. 374, 375*
*INGERSOLL-RAND CO. ("Little David," "Little Tugger"), 11 Broadway, New York, N. Y...*pp. 546, 547*
Lauson-Lawton Co., De Pere, Wis.
*LIDGERWOOD MFG. CO., 96 Liberty St., New York, N. Y...*p. 388*
Litchfield Foundry & Machine Co., Litchfield, Ill.
Milholland, J. & J. B. Co., 718 Fifth Ave., Pittsburgh, Pa.
NORDBERG MFG. CO., Milwaukee, Wis...*p. 11*
Orr & Sembower (Inc.), Reading, Pa.
OTTUMWA IRON WORKS (Inc.), Ottumwa, Iowa...*p. 385*
Shannon, J. Jacob & Co., 1744 Market St., Philadelphia, Pa.
Thomas Elevator Co., 22 South Hoyne Ave., Chicago, Ill.

—Hoisting, Geared

CONNELLSVILLE MFG. & MINE SUPPLY CO., Connellsville, Pa...*p. 384*
HUNT, C. W. CO. (Inc.), West New Brighton, Staten Island, N. Y...*pp. 374, 375*
*LIDGERWOOD MFG. CO., 96 Liberty St., New York, N. Y...*p. 388*
*NOVO ENGINE CO., Lansing, Mich...*pp. 586, 587*

—Kerosene

Alamo Engine Co., Hillsdale, Mich.
Baltimore Oil Engine Co., P. O. Box 100 Highlandtown, Baltimore, Md.
Benninghofen, C. Sons, Hamilton, Ohio
Brownwall Engine & Pulley Co., 12 W. 4th St., Holland, Mich.
Buckeye Machine Co., Lima, Ohio
Burlingame, S. F., W. Boylston St., Worcester, Mass.
Charter Gas Engine Co., Sterling, Ill.
Climax Engineering Co., Clinton, Ia.
Cook Motor Co., Delaware, Ohio
*DE LA VERGNE MACHINE CO., 1123 E. 138th St., New York, N. Y...*p. 40*
Enterprise Machinery Co., 1601 8th St., S. E., Minneapolis, Minn.
FAIRBANKS, MORSE & CO., 900 S. Wabash Ave., Chicago, Ill...*p. 41*
Field-Brundage Engine Works, Jackson, Mich.
Foos Gas Engine Co., Springfield, Ohio
Fuller & Johnson Mfg. Co., 1350 E. Washington Ave., Madison, Wis.
Gade Bros. Mfg. Co., Iowa Falls, Iowa
International Cultivator Corpn., 34 Lake Drive, Oshkosh, Wis.
Lauson-Lawton Co., De Pere, Wis.
Lauson, John Mfg. Co., New Holstein, Wis.
Middletown Machine Co., Middletown, Ohio
Mietz, August Corpn., 424 E. 19th St., New York, N. Y.
"New-Way" Motor Co., Lansing, Mich.
*NOVO ENGINE CO., Lansing, Mich...*pp. 586, 587*
Ohio Motor Co., Sandusky, Ohio
Reliance Engineering Co. ("Olds"), Lansing, Mich.

Digitized by Google

Remington Oil Engine Co., Stamford, Conn.
Standard Oil Engine Co., 130 Seaview Ave., Bridgeport, Conn.
Steiner, M. & Co., 242 Torrence St., Dayton, Ohio
Strang Engine Co., Harvey, Ill.
*TITUSVILLE IRON WORKS CO. ("Tico"), Titusville, Pa...*p. 89*
Union Gas Engine Co., Oakland, Cal.
United Engine Co., Lansing, Mich.
Weber Engine Co., Kansas City, Mo.
Western Machinery Co., 900 W. Main St., Los Angeles, Cal.
Witte Engine Works, 16th & Oakland Ave., Kansas City, Mo.
Wolverine Motor Works, Bridgeport, Conn.
*WORTHINGTON PUMP & MACHINERY CORPN., 115 Broadway, New York, N. Y. ..*pp. 44, 45, 46, 47*
Wright Machine Co. (Inc.), ("Wright Reliable"), Owensboro, Ky.

—Marine

American Engine Co., 2nd & Amsterdam Ave., Detroit, Mich.
Anderson Engine Co., 4036 N. Rockwell St., Chicago, Ill.
Bay State Iron Works, Erie, Pa.
Bolinders Co., 30 Church St., New York, N. Y.
Boston Engineering Co., India Wharf, Boston, Mass.
Buffalo Gasoline Motor Co., 1280-1290 Niagara St., Buffalo, N. Y.
Clay Engine Mfg. Co., 6950 Kinsman Road, Cleveland, Ohio
Craig Engine & Machine Works, James, 807 Garfield Ave., Jersey City, N. J.
DODGE SALES & ENGINEERING CO., Mishawaka, Ind...*pp. 42, 43, 326, 327, 328, 329*
ELLICOTT MACHINE CORPN., Baltimore, Md...*p. 588*
Evansville Gas Engine Works, 1230 Riverside Ave., Evansville, Ind.
FAIRBANKS, MORSE & CO., 900 S. Wabash Ave., Chicago, Ill...*p. 41*
Fay & Bowen Engine Co., Geneva, N. Y.
Great Lakes Engineering Works, River Rouge, Mich.
Hall-Scott Motor Car Co. (Inc.), Crocker Bldg., San Francisco, Cal.
HOOVEN, OWENS, RENTSCHLER CO., Hamilton, Ohio...*p. 10*
Inglis, John Co. (Ltd.), Toronto, Ont., Canada
*JOHNSON, CARLYLE MACHINE CO. ("Bud E"), Manchester, Conn...*p. 332*
Kahlenberg Bros. Co., Two Rivers, Wis.
Kearfott Engineering Co. (Inc.), 95 Liberty St., New York, N. Y.
Mietz, August Corpn., 424 E. 19th St., New York, N. Y.
*MORRIS MACHINE WORKS, Baldwinsville, N. Y...*pp. 578, 579*
National Marine Engine Works (Inc.), Scranton, Pa.
OLMSTEAD, A. E. & SONS, Pulaski, N. Y. ..*p. 50*
Pacific Diesel Engine Co., 2896 Glascock St., Oakland, Cal.
Page Engineering Co., Foot Latrobe Park, Baltimore, Md.
PROVIDENCE ENGINEERING CORPN., Providence, R. I...*p. 12*
Rees, James & Sons Co., Pittsburgh, Pa.
Regal Gasoline Engine Co., Coldwater, Mich.
Roberts Motor Mfg. Co., Sandusky, Ohio
Standard Gas Engine Co., East Oakland, Cal.
Sterling Engine Co., 1252-1274 Niagara St., Buffalo, N. Y.
Strang Engine Co., Harvey, Ill.
Tampa Shipbuilding & Engineering Co., Tampa, Fla.
TAYLOR MACHINE CO., 25 E. Jackson Blvd., Chicago, Ill...*p. 48*
Union Gas Engine Co., Oakland, Cal.
Universal Motor Co., Oshkosh, Wis.
VALLEY IRON WORKS CO., Appleton, Wis. ..*p. 647*
*WARD, CHARLES, ENGINEERING WORKS ("Ward"), Charleston, W. Va... *p. 92*
Weiss Engineering Co., 17 Battery Place, New York, N. Y.
*WESTINGHOUSE ELECTRIC & MFG. CO., East Pittsburgh, Pa...*pp. 160, 161*
Wolverine Motor Works, Bridgeport, Conn.
*WORTHINGTON PUMP & MACHINERY CORPN., 115 Broadway, New York, N. Y. ..*pp. 44, 45, 46, 47*

—Marine, Gasoline

Wright Machine Co. (Inc.), ("Wright Reliable"), Owensboro, Ky.

—Marine, Oil

BUSCH-SULZER BROS.-DIESEL ENGINE CO., St. Louis, Mo...*p. 36*
McINTOSH & SEYMOUR CORPN., Auburn, N. Y...*p. 38*
*WORTHINGTON PUMP & MACHINERY CORPN., 115 Broadway, New York, N. Y. ..*pp. 44, 45, 46, 47*

—Marine, Steam

MURRAY IRON WORKS CO., Burlington, Iowa,..*pp. 80, 81*
Sun Shipbuilding Co., Chester, Pa.

—Naphtha

Field-Brundage Engine Works, Jackson, Mich.

—Oil

*ALLIS-CHALMERS MFG. CO., Milwaukee, Wis...*pp. 28, 29*
American-Blakeslee Mfg. Co., Birmingham, Ala.
Anderson Foundry & Machine Co., Anderson, Ind.
Baltimore Oil Engine Co., P. O. Box 100 Highlandtown, Baltimore, Md.
Bessemer Gas Engine Co., Grove City, Pa.
Bolinders Co., 30 Church St., New York, N.Y.
Buckeye Machine Co. ("Buckeye"), Lima, Ohio
Butler Engine & Foundry Co., Butler, Pa.
Charter Gas Engine Co., Sterling, Ill.
Clark Bros. Co., Olean, N. Y.
*DE LA VERGNE MACHINE CO., 1123 E. 138th St., New York, N. Y...*p. 40*
Dissinger, C. H. A. & Bro. (Inc.), Wrightsville, Pa.
FAIRBANKS, MORSE & CO, 900 Wabash Ave., Chicago, Ill...*p. 41*
Foos Gas Engine Co., Springfield, Ohio
Hadfield-Penfield Steel Co., Bucyrus, Ohio
*INGERSOLL-RAND CO., 11 Broadway, New York, N. Y...*pp. 546, 547*
International Harvester Co. of America, 606 S. Michigan Ave., Chicago, Ill.
Jacobson Engineering Co., Albany, N. Y.
Kahlenberg Bros. Co., Two Rivers, Wis.
McEwen Brothers, Wellsville, N. Y.
McINTOSH & SEYMOUR CORPN., Auburn, N. Y...*p. 38*
Mietz, August Corpn., 424 E. 19th St., New York, N. Y.
Minneapolis Steel & Machinery Co., 29th & Minnehaha Ave., Minneapolis, Minn.
Muncie Oil Engine Co., 700 S. Mulberry St., Muncie, Ind.
NATIONAL SUPPLY CO., Toledo, Ohio... *pp. 648, 649*
NORDBERG MFG. CO., Milwaukee, Wis...*p. 11*
Olin Gas Engine Co., 10 Lock St., Buffalo, N. Y.
Otto Engine Mfg. Co., 3215 Walnut St., Philadelphia, Pa.

Digitized by Google

Pacific Diesel Engine Co., 2896 Glasscock St., Oakland, Cal.
Pittsburgh Filter U Engineering Co., 280 Broadway, New York, N. Y.
Power Mfg. Co. (''Primm''), Cheney Ave., Marion, Ohio
Price, G. W. Pump & Engine Co., 33 Stevenson St., San Francisco, Cal.
Rathbun Jones Engineering Co., Toledo, O.
Reid, Joseph Gas Engine Co., Oil City, Pa.
Reliable Tractor & Engine Co. (''Reliable''), Portsmouth, Ohio
Remington Oil Engine Co., Stamford, Conn.
Standard Oil Engine Co., 130 Seaview Ave., Bridgeport, Conn.
Stover Mfg. & Engine Co., Freeport, Ill.
Strang Engine Co., Harvey, Ill.
Superior Gas Engine Co., Springfield, O.
TAYLOR MACHINE CO., 25 E. Jackson Blvd., Chicago, Ill...*p. 48*
*TITUSVILLE IRON WORKS CO. (''Tico''), Titusville, Pa...*p. 89*
Turner-Fricke Mfg. Co., Pittsburgh, Pa.
Union Tool Co., Torrance, Cal.
Weber Engine Co., Kansas City, Mo.
Weiss Engineering Co., 17 Battery Pl., New York, N. Y.
*WORTHINGTON PUMP & MACHINERY CORPN., 115 Broadway, New York, N. Y. ..*pp. 44, 45, 46, 47*

—Oil (Crude)
American-Blakeslee Mfg. Co., Birmingham, Ala.

—Oil, Diesel
*ALLIS-CHALMERS MFG. CO., Milwaukee, Wis...*pp. 28, 29*
BUSCH-SULZER BROS.-DIESEL ENGINE CO., St. Louis, Mo...*p. 36*
Craig, James Engine & Machine Works, 807 Garfield Ave., Jersey City, N. J.
*DE LA VERGNE MACHINE CO., 1123 E. 138th St., New York, N. Y...*p. 40*
DODGE SALES & ENGINEERING CO., Mishawaka, Ind...*pp. 42, 43, 326, 327, 328, 329*
Dow Pump & Diesel Engine Co., Alameda, Cal.
FULTON IRON WORKS CO., St. Louis, Mo. ..*p. 37*
Fulton Mfg. Co., Erie, Pa.
McINTOSH & SEYMOUR CORPN., Auburn, N. Y...*p. 38*
Midwest Engine Co., Indianapolis, Ind.
National Transit Pump & Machine Co., 19 North Petroleum St., Oil City, Pa.
NEW LONDON SHIP & ENGINE CO., Groton, Conn...*p. 39*
NORDBERG MFG. CO. (''Nordberg-Carels''), Milwaukee, Wis...*p. 11*
Pacific Diesel Engine Co., 2896 Glasscock St., Oakland, Cal.
St. Mary's Oil Engine Co., St. Charles, Mo.
TAYLOR MACHINE CO., 25 E. Jackson Blvd., Chicago, Ill...*p. 48*
Western Machinery Co., 900 N. Main St., Los Angeles, Cal.
*WORTHINGTON PUMP & MACHINERY CORPN., 115 Broadway, New York, N. Y. ..*pp. 44, 45, 46, 47*

—Oil, Semi-Diesel
CHICAGO PNEUMATIC TOOL CO. (''Giant''), 6 E. 44th St., New York, N. Y...*p. 548*
Lazier Gas Engine Co., Buffalo, N. Y.
Power Mfg. Co. (''Primm''), Cheney Ave., Marion, Ohio

—Pumping
*ALLIS-CHALMERS MFG. CO., Milwaukee, Wis...*pp. 28, 29*
American Well Works, Aurora, Ill.
Anderson Engine Co., 4036 N. Rockwell St., Chicago, Ill.
Augustine Automatic Rotary Engine Co., 1862 Elmwood Ave., Buffalo, N. Y.
*DE LAVAL STEAM TURBINE CO., Trenton, N. J...*p. 22*
ELLICOTT MACHINE CORPN., Baltimore, Md...*p. 588*
FAIRBANKS, MORSE & CO., 900 S. Wabash Ave., Chicago, Ill...*p. 41*
HOOVEN, OWENS, RENTSCHLER CO., Hamilton, Ohio...*p. 10*
Hydraulic Gas Power Co., Foot So. Phelps St., Youngstown, Ohio
*KERR TURBINE CO., Wellsville, N. Y... *p. 23*
LUITWIELER PUMPING ENGINE CO., Rochester, N. Y...*p. 569*
McGOWAN, JOHN H. CO., Cincinnati, Ohio ..*pp. 574, 575*
MURRAY IRON WORKS CO., Burlington, Iowa..*pp. 80, 81*
NORDBERG MFG. CO., Milwaukee, Wis... *p. 11*
PRESCOTT CO., Menominee, Mich...*p. 580*
Standard Pump & Engine Co., Akron, Ohio
*WORTHINGTON PUMP & MACHINERY CORPN., 115 Broadway, New York, N. Y. ..*pp. 44, 45, 46, 47*

—Steam
Ajax Iron Works, Corry, Pa.
*ALLIS-CHALMERS MFG. CO., Milwaukee, Wis...*pp. 28, 29*
AMES IRON WORKS, Oswego, N. Y...*p. 4*
Augustine Automatic Rotary Engine Co., 1862 Elmwood Ave., Buffalo, N. Y.
AUTOMATIC FURNACE CO. (''Acme''), Dayton, Ohio...*pp. 112, 113*
Avery Co., Peoria, Ill.
Bay State Iron Works, Erie, Pa.
BROWNELL CO., Dayton, Ohio...*p. 59*
Brunswick Refrigerating Co., New Brunswick, N. J.
Buckeye Engine Co., Salem, Ohio
Butler Engine & Foundry Co., Butler, Pa.
Chandler & Taylor Co., Indianapolis, Ind.
CHICAGO PNEUMATIC TOOL CO. (''Giant''), 6 E. 44th St., New York, N. Y...*p. 548*
Chuse Engine & Mfg. Co., Mattoon, Ill.
CLARAGE FAN CO., Kalamazoo, Mich...*pp. 556, 557*
CONNELLSVILLE MFG. & MINE SUPPLY CO., Connellsville, Pa...*p. 384*
Dake Engine Co., Grand Haven, Mich.
ENGBERG'S ELECTRIC & MECHANICAL WORKS, 18 Vine St., St. Joseph, Mich... *pp. 6, 7*
Enterprise Co., Columbiana, Ohio
ERIE ENGINE WORKS, Erie, Pa...*p. 8*
Farquhar, A. B. Co. (Ltd.), York, Pa.
Fitchburg Steam Engine Co., Fitchburg, Mass.
Frick Co. (Inc.), Waynesboro, Pa.
G. E. Engineering Co. (Ltd.), 22 Laight St., New York, N. Y.
Goldie & McCulloch Co. (Ltd.), Galt, Ont., Canada
Hewes & Phillips Iron Works, Newark, N. J.
HOOVEN, OWENS, RENTSCHLER CO., Hamilton, Ohio...*p. 10*
Houston, Stanwood & Gamble Co., Cincinnati, Ohio
*INGERSOLL-RAND CO., 11 Broadway, New York, N. Y...*pp. 546, 547*
Knowlton & Kelly, Troy, N. Y.
Lawrence Machine Co., Lawrence, Mass.
*LEFFEL, JAMES & CO., Springfield, Ohio. ..*p. 33*
Liddell Co., Charlotte, N. C.
Llewellyn Iron Works, Los Angeles, Cal.
Lucey Mfg. Corpn., Woolworth Bldg., New York, N. Y.
Machold & Riddell, 1020 Stephen Girard Bldg., Philadelphia, Pa.

Digitized by Google

Mecklenburg Iron Works, Charlotte, N. C.
Mesta Machine Co., Box 1124, Pittsburgh, Pa.
MURRAY IRON WORKS CO., Burlington, Iowa..*pp. 80, 81*
National Marine Engine Works (Inc.), Scranton, Pa.
NATIONAL SUPPLY CO. (''Ajax''), Toledo, Ohio...*pp. 648, 649*
NEW YORK BLOWER CO., Chicago, Ill...*p. 555*
Oil Well Supply Co., 213-215 Water St., Pittsburgh, Pa.
OLMSTEAD, A. E. & SONS, Pulaski, N. Y...*p. 50*
Orr & Sembower (Inc.), Reading, Pa.
PROVIDENCE ENGINEERING CORPN., Providence, R. I...*p. 12*
Randle Machinery Co., Cincinnati, Ohio
Ridgway Dynamo & Engine Co., Ridgway, Pa.
Southern Engine & Boiler Works, Jackson Tenn.
*TITUSVILLE IRON WORKS CO. (''Acme''), Titusville, Pa...*p. 89*
WACHS, E. H. CO., 1525 Dayton St., Chicago, Ill...*p. 15*
*WESTINGHOUSE ELECTRIC & MFG. CO. East Pittsburgh, Pa...*pp. 160, 161*
*WHEELER, C. H. MFG. CO., Sedgley & Lehigh Aves., Philadelphia, Pa...*p. 163*

—Steam, Automatic

*AMERICAN BLOWER CO., Detroit, Mich...*p. 553*
AMES IRON WORKS, Oswego, N. Y...*p. 4*
BROWNELL CO., Dayton, Ohio...*p. 59*
Buckeye Engine Co., Salem, Ohio
CLARAGE FAN CO., Kalamazoo, Mich...*pp. 556, 557*
CONNELLSVILLE MFG. & MINE SUPPLY CO., Connellsville, Pa...*p. 584*
Dutton, C. H. Co., Kalamazoo, Mich.
ERIE BALL ENGINE CO., Pittsburgh, Pa...*p. 5*
*ERIE CITY IRON WORKS, Erie, Pa...*pp. 66, 67*
ERIE ENGINE WORKS (''Victor''), Erie, Pa...*p. 8*
FROST MFG. CO., 112 Adams St., Chicago Ill...*pp. 68, 634*
Ide, A. L. & Sons (''Ideal''), Springfield Ill.
*LEFFEL, JAMES & CO., Springfield, Ohio...*p. 33*
MURRAY IRON WORKS CO., Burlington Iowa...*pp. 80, 81*
Nagle Engine & Boiler Works, 234 E. 16th St., Erie, Pa.
Peer Mfg. Co. (''Climax''), Comstock, Mich.
Reeves Engineering Co., Trenton, N. J.
Rollins Engine Co., Nashua, N. H.
Schofield's, J. S. Sons Co., Macon, Ga.
SKINNER ENGINE CO., Erie, Pa...*p. 13*
STURTEVANT, B. F. CO., Hyde Park, Boston, Mass...*p. 106*
*TROY ENGINE & MACHINE CO. (''Troy''), Troy, Pa...*p. 14*
*WESTINGHOUSE ELECTRIC & MFG. CO., East Pittsburgh, Pa...*pp. 160, 161*

—Steam, Corliss

*ALLIS-CHALMERS MFG. CO., Milwaukee, Wis...*pp. 28, 29*
AMES IRON WORKS, Oswego, N. Y...*p. 4*
BASS FOUNDRY & MACHINE CO., Fort Wayne, Ind...*p. 57*
Birmingham Machine & Foundry Co., Birmingham, Ala.
Brown Engine Co., Fitchburg, Mass.
Chuse Engine & Mfg. Co., Mattoon, Ill.
Cooper, C. & H. Co., Mt. Vernon, Ohio
ERIE BALL ENGINE CO., Pittsburgh, Pa...*p. 5*
Filer & Stowell Co., Milwaukee, Wis.
FRANKLIN MACHINE CO. (''Harris''), P. O. Address Box 1393, Providence, R. I...*p. 9*
FULTON IRON WORKS CO., St. Louis, Mo...*p. 37*
Hardie-Tynes Mfg. Co., 8th Ave. & 28th St., Birmingham, Ala.
Hewes & Phillips Iron Works, Newark, N. J.
HOOVEN, OWENS, RENTSCHLER CO., Hamilton, Ohio...*p. 10*
Ide, A. L. & Sons (''Ideal''), Springfield, Ill.
Lane & Bodley Co. (''Columbian''), Bond Hill, Cincinnati, Ohio
MURRAY IRON WORKS CO., Burlington, Iowa...*pp. 80, 81*
NORDBERG MFG. CO., Milwaukee, Wis...*p. 11*
PROVIDENCE ENGINEERING CORPN. (''Rice & Sargent''), Providence, R. I...*p. 12*
Rollins Engine Co., Nashua, N. H.
St. Louis Iron & Machine Works, 126 Chouteaux Ave., St. Louis, Mo.
Tri-State Engrg. Co., 130-46 S. 5th St., Zanesville, Ohio
*VILTER MFG. CO., 1194-1196 Clinton St., Milwaukee, Wis...*pp. 16, 17*
Watts Campbell Co., 298 Ogden St., Newark, N. J.

—Steam, High Speed

*AMERICAN BLOWER CO., Detroit, Mich...*p. 553*
AMES IRON WORKS, Oswego, N. Y...*p. 4*
BROWNELL CO., Dayton, Ohio...*p. 59*
Buckeye Engine Co., Salem, Ohio
CLARAGE FAN CO., Kalamazoo, Mich...*pp. 556, 557*
ERIE BALL ENGINE CO., Pittsburgh, Pa...*p. 5*
ERIE ENGINE WORKS, Erie, Pa...*p. 8*
Fitchburg Steam Engine Co., Fitchburg, Mass.
Ide, A. L. & Sons (''Ideal''), Springfield, Ill.
*MORRIS MACHINE WORKS, Baldwinsville, N. Y...*pp. 578, 579*
NORDBERG MFG. CO., Milwaukee, Wis...*p. 11*
Shepherd Engineering Co., Williamsport, Pa.
SKINNER ENGINE CO., Erie, Pa...*p. 13*
STURTEVANT, B. F. CO., Hyde Park, Boston, Mass...*p. 106*
*TROY ENGINE & MACHINE CO. (''Troy''), Troy, Pa...*p. 14*
*VILTER MFG. CO., 1194-1196 Clinton St., Milwaukee, Wis...*pp. 16, 17*
WACHS, E. H. CO., 1525 Dayton St., Chicago, Ill...*p. 15*

—Steam, Poppet Valve

Chuse Engine & Mfg. Co., Mattoon, Ill.
*ERIE CITY IRON WORKS (''Lentz''), Erie, Pa...*pp. 66, 67*
NORDBERG MFG. CO. (''Nordberg-Todd''), Milwaukee, Wis...*p. 11*
*VILTER MFG. CO., 1194-1196 Clinton St., Milwaukee, Wis...*pp. 16, 17*

—Steam, Throttling

AMES IRON WORKS, Oswego, N. Y...*p. 4*
BROWNELL CO., Dayton, Ohio...*p. 59*
CLARAGE FAN CO., Kalamazoo, Mich...*pp. 556, 557*
*COLE, R. D. MFG. CO., Newnan, Ga...*p. 63*
Corinth Machinery Co., Corinth, Miss.
ERIE BALL ENGINE CO., Pittsburgh,..*p. 5*
ERIE ENGINE WORKS (''Victor''), Erie, Pa...*p. 8*
FROST MFG. CO., 112 W. Adams St., Chicago, Ill...*pp. 68, 634*
Godfrey, Keeler Co., 70 Warren St., New York, N. Y.
*LEFFEL, JAMES & CO., Springfield, Ohio...*p. 33*

Digitized by Google

*MORRIS MACHINE WORKS, Baldwinsville, N. Y...*pp. 578, 579*
MURRAY IRON WORKS CO., Burlington, Iowa...*pp. 80, 81*
Nagel Engine & Boiler Works, 234 E. 16th St., Erie, Pa.
Orr & Sembower (Inc.), Reading, Pa.
*TROY ENGINE & MACH. CO. (''Troy''), Troy, Pa...*p. 14*
WACHS, E. H. CO., 1525 Dayton St., Chicago, Ill...*p. 15*

—Steam, Uniflow
AMES IRON WORKS, Oswego, N. Y...*p. 4*
Chuse Engine & Manufacturing Co., Mattoon, Ill.
Filer & Stowell Co., Milwaukee, Wis.
Granger, A. D. Co., 15 Park Row, New York, N. Y.
Harrisburg Foundry & Machine Works, Harrisburg, Pa.
Kingsford Foundry & Machine Works, Oswego, N. Y.
Mesta Machine Co., Box 1124, Pittsburgh, Pa.
NORDBERG MFG. CO., Milwaukee, Wis...*p. 11*
Reeves Engineering Co., Trenton, N. J.
SKINNER ENGINE CO. (''Universal Unaflow''), Erie, Pa...*p. 13*

—Steam, Variable Speed
BROWNELL CO., Dayton, Ohio...*p. 59*
ERIE BALL ENGINE CO., Pittsburgh, Pa...*p. 5*
Soule Steam Feed Works, Meridan, Miss.

—Steam, Vertical (Fully Enclosed, Self-Oiling)
CLARAGE FAN CO., Kalamazoo, Mich...*pp. 556, 557*
ERIE ENGINE WORKS, Erie, Pa...*p. 8*
TROY ENGINE & MACHINE CO., Troy, Pa...*p. 14*
WACHS, E. H. CO., 1525 Dayton St., Chicago, Ill...*p. 15*

—Steering
*LIDGERWOOD MFG. CO., 96 Liberty St., New York, N. Y...*p. 388*

—Swinging
AMERICAN HOIST & DERRICK CO., St. Paul, Minn...*p. 383*
Chase Machine Co., 2313 Elm St., N. W., Cleveland Ohio
*LIDGERWOOD MFG. CO., 96 Liberty St., New York, N. Y...*p. 388*

—Traction
Enterprise Machinery Co., 1601 8th St., S. E., Minneapolis, Minn.
Holt Mfg. Co., Stockton, Cal.
Holt Mfg. Co., Peoria, Ill.

—Water Driven
Roberts, Geo. J. Co., 235-251 E. 2nd St., Dayton, Ohio

ENGRAVING MACHINES
Gorton, George Machine Co., Racine, Wis.

ENVELOPE MAKING MACHINERY
Bickett Machine & Mfg. Co., Cincinnati, O.
Potdevin Machine Co., 1222 38th St., Brooklyn, N. Y.
Smithe, F. L. Machine Co. (Inc.), 150 11th Ave., New York, N. Y.

EQUIPMENT: *See*
Boiler Washing
Brewers'
Chemical Works
Coal Preparing
Concrete Distributing
Dairy
Dehydrating
Flue Shop
Foundry
Foundry Sand Handling
Galvanizing
Gas Burning
Grain Elevator
Liquid Fuel
Metal Finishing
Oil Burning
Oil Refinery
Oxygen-Hydrogen Generating
Platers'
Pulverized Coal
Steel Works
Tire Factory
Tube Works
Ultra Violet Ray

EVAPORATORS
*BADGER, E. B. & SONS CO., 75 Pitts St., Boston, Mass...*p. 164*
Black-Clawson Co., Hamilton, Ohio
*BRAUN, C. F. & CO., San Francisco, Cal...*pp. 156, 157*
Buffalo Foundry & Machine Co., 41 Winchester Ave., Buffalo, N. Y.
Columbus Iron Works Co., Columbus, Ga.
DEVINE, J. P. CO., 1375 Clinton St., Buffalo, N. Y...*pp. 606, 607*
Hercules Engineering Corpn., 501 Fifth Ave., New York, N. Y.
Hodges Water Still Co. (Inc.), 5713 Appletree St., Philadelphia, Pa.
Kilby Mfg. Co., Cleveland, Ohio
LOUISVILLE DRYING MACHINERY CO., Louisville, Ky...*p. 608*
NEW YORK CENTRAL IRON WORKS CO. (Inc.), North Middleburg Road, Hagerstown, Md...*p. 659*
*SCHUTTE & KOERTING CO., 1184 Thompson St., Philadelphia, Pa...*p. 159*
STANDARD WATER SYSTEMS CO., Hampton, N. J...*p. 144*
STEACY-SCHMIDT MFG. CO., York, Pa...*p. 612*
Stocker, George J., St. Louis, Mo.
Wallace-Bird Pine Products Co. (Inc.), 5 Beekman St., New York, N. Y.
*WHEELER CONDENSER & ENGRG. CO., Carteret, N. J...*p. 162*

—Crystallizing
STEACY-SCHMIDT MFG. CO., York, Pa...*p. 612*
SWENSON EVAPORATOR CO., 945 Monadnock Bldg., Chicago, Ill...*p. 611*
Zaremba Co., 506 Niagara Life Bldg., Buffalo, N. Y.

—High Density
SWENSON EVAPORATOR CO., 945 Monadnock Bldg., Chicago, Ill...*p. 611*

—Milk
Harris, Arthur & Co., 212 Curtis St., Chicago, Ill.

—Multiple
*CASEY-HEDGES CO., Chattanooga, Tenn...*pp. 60, 61*
Griscom-Russell Co., 90 West St., New York, N. Y.
Kestner Evaporator Co., 18th St. & Allegheny Ave., Philadelphia, Pa.
LOUISVILLE DRYING MACHINERY CO., Louisville, Ky...*p. 608*
Philadelphia Coppersmithing Co., 222-226 N. Front St., Philadelphia, Pa.
STANDARD WATER SYSTEMS CO. (''Standard Multicoil''), Hampton, N. J...*p. 144*
SWENSON EVAPORATOR CO., 945 Monadnock Bldg., Chicago, Ill...*p. 611*
*U. S. CAST IRON PIPE & FOUNDRY CO., Burlington, N. J...*pp. 232, 233*
*WHEELER CONDENSER & ENGINEERING CO., Carteret, N. J...*p. 162*
Zaremba Co., 506 Niagara Life Bldg., Buffalo, N. Y.

—Salt
Kestner Evaporator Co., 18th & Allegheny Ave., Philadelphia, Pa.

Ev

Digitized by Google

EVAPORATORS (Continued)
LOUISVILLE DRYING MACHINERY CO., Louisville, Ky...*p. 608*
WILLCOX ENGINEERING CO., Saginaw, Mich...*pp. 272, 613*
—Sugar
*CASEY-HEDGES CO., Chattanooga, Tenn. ..*pp. 60, 61*
Honolulu Iron Works Co., Honolulu, T. H.
LOUISVILLE DRYING MACHINERY CO. Louisville, Ky...*p. 608*
Murphy, John H. Iron Works, Magazine & Girod Sts., New Orleans, La.
STEACY-SCHMIDT MFG. CO., York, Pa... *p. 612*
SWENSON EVAPORATOR CO., 945 Monadnock Bldg., Chicago, Ill...*p. 611*
*U. S. CAST IRON PIPE & FOUNDRY CO., Burlington, N. J...*pp. 232, 233*
*WHEELER CONDENSER & ENGINEERING CO., Carteret, N. J...*p. 162*

EXCAVATING MACHINERY
Austin Machinery Corpn. (''Austin''), Railway Exchange Bldg., Chicago, Ill.
Browning Co., 16226 Waterloo Rd., Cleveland, Ohio
Bucyrus Co., South Milwaukee, Wis.
Castle, A. M. Engineering Co. (Inc.), La Crosse, Wis.
Clyde Iron Works Sales Co., 29th Ave., W. & Michigan St., Duluth, Minn.
Dravo Contracting Co., Engineering Works Dept., Pittsburgh, Pa.
Dull, Raymond W. Co., 111 W. Washington St., Chicago, Ill.
Gade Bros. Mfg. Co., Iowa Falls, Ia.
Hayward Co., 50 Church St., New York, N. Y.
Keystone Driller Co., Beaver Falls, Pa.
*LIDGERWOOD MFG. CO., 96 Liberty St., New York, N. Y...*p. 388*
Marion Steam Shovel Co, Marion, Ohio
Monighan Machine Co., 2024 Carroll Ave., Chicago, Ill.
Northwest Engineering Works (''Northwest''), Green Bay, Wis.
Parsons Co., Newton, Iowa
*PAWLING & HARNISCHFEGER CO. (''P. & H.''), Milwaukee, Wis...*p. 398*
Potter Mfg. Co., 3511 E. Washington St., Indianapolis, Ind.
Sauerman Bros., 314 S. Dearborn St., Chicago, Ill.
Smith, T. L. Co., 470 Old Colony Bldg., Chicago, Ill.
Steele, J. C. & Sons, Statesville, N. C.
Thew Shovel Co., Lorain, Ohio
Toledo Foundry & Machine Co., Toledo, Ohio
UNION ENGINEERING CO., Cleveland, Ohio ..*p. 645*
Union Iron Works, Newark Ave. & Monroe St., Hoboken, N. J.

EXHAUST FANS
(See Fans, Exhaust)

EXHAUST HEADS
Burt Mfg. Co., Akron, Ohio
Colles Heater & Specialty Co., 343 S. Dearborn St., Chicago, Ill.
*CRANE CO., 836 S. Michigan Ave., Chicago, Ill...*pp. 170, 171, 172, 173*
Direct Separator Co., Syracuse, N. Y.
Godfrey, Keeler Co., 70 Warren St., New York.
*ILLINOIS ENGINEERING CO. (''Eclipse''), Racine Ave. at 21st Street, Chicago, Ill...*pp. 210, 211*
*KIELEY & MUELLER (Inc.) (''Kieley''), 34 W. 13th St., New York, N. Y...*p. 212*
Nightingale & Childs Co., 205 Congress St., Boston, Mass.
*PITTSBURGH VALVE, FOUNDRY & CONSTRUCTION CO., P. O. Box 1016, Pittsburgh, Pa...*pp. 192, 193*
SIMS CO., Erie, Pa...*p. 152*
SKINNER BROS. MFG. CO. (Inc.), 1400-1490 Vandevanter Ave., St. Louis, Mo... *p. 621*
STURTEVANT, B. F. CO., Hyde Park, Boston, Mass...*p. 106*
Wright-Austin Co., 315 W. Woodbridge St., Detroit, Mich.

EXHAUST SYSTEMS
*ALLINGTON & CURTIS MFG. CO., Saginaw, Mich...*p. 554*
*AMERICAN BLOWER CO., Detroit, Mich. ..*p. 553*
CLARAGE FAN CO., Kalamazoo, Mich...*pp. 556, 557*
Clark Dust Collecting Co., Fisher Bldg., Chicago, Ill.
Connecticut Blower Co. (Inc.), 135 Sheldon St., Hartford, Conn.
Cyclone Blow Pipe Co., 2552 W. 21st St., Chicago, Ill.
NEW YORK BLOWER CO., Chicago, Ill... *p. 555*
Northern Blower Co., West 65th & Dennison Ave., Cleveland, Ohio
*PANGBORN CORPN., P. O. Box 859, Hagerstown, Md...*pp. 636, 637*
PHILADELPHIA DRYING MACHINERY, 3351 Stokeley St., Philadelphia, Pa...*p. 610*
SKINNER BROS. MFG. CO. (Inc.), 1400-1490 Vandevanter Ave., St. Louis, Mo.. *p. 621*

EXHAUSTERS, GAS
Buffalo Forge Co., 490 Broadway, Buffalo, N. Y.
CLARAGE FAN CO., Kalamazoo, Mich...*pp. 556, 557*
Connersville Blower Co., Connersville, Ind.
Glamorgan Pipe & Foundry Co., Lynchburg, Pa.
*GREEN FUEL ECONOMIZER CO., Beacon, N. Y...*pp. 96, 97*
Indiana Fan Co., 40 E. South St., Indianapolis, Ind.
NEW YORK BLOWER CO. (''Sevi-Vane''), Chicago, Ill...*p. 555*
Roots, P. H. & F. M. Co., Connersville, Ind.
SPENCER TURBINE CO., Hartford, Conn. ..*p. 552*
STURTEVANT, B. F. CO., Hyde Park, Boston, Mass...*p. 106*
WILBRAHAM-GREEN BLOWER CO., Pottstown, Pa...*p. 559*

EXPANDERS, BOILER TUBE
Dudgeon, Richard, Broom & Columbia Sts., New York, N. Y.
Faessler, J. Mfg. Co., Moberly, Mo.
Henderer's, A. L. Sons, Wilmington, Del.
KEY BOILER EQUIPMENT CO., 27th & McCasland Ave., East St. Louis, Ill... *pp. 100, 101*
Nicholson, W. H. & Co., 12 Oregon St., Wilkes-Barre, Pa.

EXPANSION BOLTS, JOINTS, ETC.
(See Bolts, Joints, Etc., Expansion)

EXPERIMENTAL WORK
AMERICAN TOOL & MACHINE CO., Boston 9, Mass...*p. 614*
BURROUGHS, CHARLES CO. (The), Newark, N. J...*p. 590*
DOVE-SMITH & SON, Niagara Falls, N. Y. ..*p. 492*
Emery, A. H., Maple Ave., Glenbrook, Conn.
Hart, Frederick & Co. (Inc.), 837 Main St., Poughkeepsie, N. Y.
Maintenance Co. (Inc.), 449-53 W. 42nd St., New York, N. Y.
Michigan Gear & Engineering Co. (Inc.), 19 W. Woodridge St., Detroit, Mich.
Weiss, Louis T., 295 Taaffe Place, Brooklyn, N. Y.
Winchester Repeating Arms Co., New Haven, Conn.

Digitized by Google

EXPLOSIVES MAKING APPARATUS
Downing Mfg. Co., West Downington, Pa.
Luther Mfg. Co. (Inc.), 133 Railroad Ave., Olean, N. Y.

EXTENSOMETERS
Holtz & Co. (Inc.), 17 Madison Ave., New York, N. Y.
RIEHLE BROS. TESTING MACHINE CO., 1424 N. 9th St., Philadelphia, Pa...*p. 268*

EXTRACTORS
DEVINE, J. P. CO., 1375 Clinton St., Buffalo, N. Y...*pp. 606, 607*

—Bushings
Conant & Donelson Co., Conway, Mass.

—Centrifugal
AMERICAN TOOL & MACHINE CO. (''Weston''), Boston 9, Mass...*p. 614*
*DE LAVAL STEAM TURBINE CO., Trenton, N. J...*p. 22*
Fletcher Works, Glenwood Ave. & 2nd St., Philadelphia, Pa.
Hepworth, S. S. Co., 2 Rector St., New York, N. Y.
*TOLHURST MACHINE WORKS, Troy, N. Y...*p. 616*

—Hydro
AMERICAN TOOL & MACHINE CO. (''Weston''), Boston 9, Mass...*p. 614*
Hepworth, S. S. Co., 2 Rector St., New York, N. Y.
*TOLHURST MACHINE WORKS, Troy, N. Y...*p. 616*

—Oil and Grease
AMERICAN STEAM GAUGE & VALVE MFG. CO. (''American H-2-O''), Boston, Mass...*pp. 200, 201*
BARTLETT, C. O. & SNOW CO., Cleveland, Ohio...*p. 367*
Blackburn Smith Corpn., 105 W. 40th St., New York, N. Y.
*BRAUN, C. F. & CO., San Francisco, Cal. ..*pp. 156, 157*
Curtis Oil Extractor (''Curtis''), P. O. Box 44, Worcester, Mass.
Jacobs, Charles & Co. (''Lowden''), 258 Franklin St., Boston, Mass.
*KIELEY & MUELLER (Inc.) (''Kieley''), 34 W. 13th St., New York, N. Y...*p. 212*
Linton Machine Co., 26 Cortlandt St., New York, N. Y.
National Separator & Machine Co., 739 Boylston St., Boston, Mass.
Patterson-Kelley Co., 26 Cortlandt St., New York, N. Y.
*SCHUTTE & KOERTING CO., 1184 Thompson St., Philadelphia, Pa...*p. 159*
SIMS CO., Erie, Pa...*p. 152*
STANDARD WATER SYSTEM CO., Hampton, N. J...*p. 144*

—Screw
CLEVELAND TWIST DRILL CO. (''Ezy-Out''), Cleveland, Ohio...*p. 502*

—Tar
SMITH, GAS ENGINEERING CO., Dayton, Ohio..*p. 94*

EXTRUDED METALS
(See Metals, Extruded)

F

FABRIC COATING MACHINES
AMERICAN TOOL & MACHINE CO., Boston 9, Mass...*p. 614*

FACE-PLATE JAWS (Portable)
Cushman Chuck Co., Hartford, Conn.
HOGGSON & PETTIS MFG. CO., New Haven, Conn...*pp. 512, 513, 514*

FACING HEADS
Mummert, Dixon Co., Hanover, Pa.

FACINGS (Clutch)
DETROIT OAK BELTING CO., Detroit, Mich...*p. 360*
Hide, Leather & Belting Co. (''Leathertex''), Indianapolis, Ind.
*JOHNS-MANVILLE (Inc.), New York, N. Y...*p. 244*

FANS

—Exhaust
*AMERICAN BLOWER CO. (''Sirocco''), Detroit, Mich...*p. 553*
Backus Water Motor Co., 172-182 Pennsylvania Ave., Newark, N. J.
Barney Ventilating Fan Works, 25 Haverhill St., Boston, Mass.
Buckeye Blower Co., Town & Lucas Sts., Columbus, Ohio
Carrier Air Conditioning Co., Buffalo, N. Y.
CLARAGE FAN CO., Kalamazoo, Mich...*pp. 556, 557*
Cleveland Blow Pipe & Mfg. Co., 6950 Kinsman Road, Cleveland, Ohio
Colonial Fan & Motor Co., Warren, Ohio
Connecticut Blower Co. (inc.), 135 Sheldon St., Hartford, Conn.
CONNELLSVILLE MFG. & MINE SUPPLY CO., Connellsville, Pa...*p. 384*
COPPUS ENGINEERING & EQUIPMENT CO., 342, 348 Park Ave., Worcester, Mass. ..*pp. 104, 105*
Cyclone Blow Pipe Co., 2552 W. 21st St., Chicago, Ill.
*DE LAVAL STEAM TURBINE CO., Trenton, N. J...*p. 22*
Dixie Mfg. Co. (Inc.), Russell St. & B. & O. R. R., Baltimore, Md.
Doehl Mfg. Co., Elizabethport, N. J.
Eck Dynamo & Motor Co., Belleville, N. J.
Electric Blower Co., 352 Atlantic Ave., Boston, Mass.
FAIRBANKS, MORSE & CO., 900 S. Wabash Ave., Chicago, Ill...*p. 41*
Fidelity Electric Co., 331 N. Arch St., Lancaster, Pa.
*GENERAL ELECTRIC CO., Schenectady, N. Y...*pp. 18, 19, 20, 21*
*GREEN FUEL ECONOMIZER CO., Beacon, N. Y...*pp. 96, 97*
Hersh Brothers Co. (''Lehigh''), Allentown, Pa.
Howard & Morse, 45 Fulton St., New York, N. Y.
Ideal Heating Co., 915 Gates Ave., Brooklyn, N. Y.
Ilg Electric Ventilating Co., Crawford Ave. near Diversey Boul., Chicago, Ill.
Indiana Fan Co., 40 E. South St., Indianapolis, Ind.
*KERR TURBINE CO., Wellsville, N. Y...*p. 23*
Kimble Electric Co., 634 N. Western Ave., Chicago, Ill.
Kirk & Blum Mfg. Co., Cincinnati, Ohio
Meadon's Blower & Pipe Works, 23-27 Meserole Ave., Brooklyn, N. Y.
National Blow Pipe & Mfg. Co., 738 Dryades St., New Orleans, La.
New England Ventilating & Heating Co., 926 Manton Ave., Providence, R. I.
NEW YORK BLOWER CO. (''Seri-Vane'') Chicago, Ill...*p. 555*
*PANGBORN CORP., P. O. Box 859, Hagerstown, Md...*pp. 636, 637*
Peerless Electric Co., Warren, Ohio
PERKINS, B. F. & SON (Inc.), Holyoke, Mass...*p. 558*
PHILADELPHIA DRYING MACHINERY CO., 3351 Stokeley St., Philadelphia, Pa. ..*p. 610*
Robbins & Myers Co., Springfield, Ohio
*SCHUTTE & KOERTING CO., 1184 Thompson St., Philadelphia, Pa...*p. 159*

Fa

Digitized by Google

FANS (Continued)
SKINNER BROS. MFG. CO. (Inc.), 1400-1490 Vandevanter Ave., St. Louis, Mo... *p. 621*
Stratton & Bragg Co., Petersburg, Va.
WING, L. J. MFG. CO. (''Wing-Scruplex''), 352 W. 13th St., New York, N. Y...*pp. 107, 625*
*WESTINGHOUSE ELECTRIC & MFG. CO., East Pittsburgh, Pa. *pp. 160, 161*
Zellweger, J. & Sons, 1900 Adelaide Ave., St. Louis, Mo.

—Exhaust, Mine
*AMERICAN BLOWER CO., Detroit, Mich. *p. 553*
Buckeye Blower Co., Towne & Lucas Sts., Columbus, Ohio
Chuse Engine & Mfg. Co., Mattoon, Ill.
CLARAGE FAN CO., Kalamazoo, Mich...*pp. 556, 557*
CONNELLSVILLE MFG. & MINE SUPPLY CO., Connellsville, Pa...*p. 384*
Crawford & McCrimmon Co., Brazil, Ind.
FAIRBANKS, MORSE & CO., 900 S. Wabash Ave., Chicago, Ill...*p. 41*
*GREEN FUEL ECONOMIZER CO., Beacon, N. Y...*pp. 96, 97*
JEFFREY MFG. CO., 904 N. 4th St., Columbus, Ohio..*pp. 376, 377*
Stine, J. C. Co., Tyrone, Pa.
STURTEVANT, B. F. CO., Hyde Park, Boston, Mass...*p. 106*
Western Blower Co., 1800 9th Ave., South, Seattle, Wash.
*WESTINGHOUSE ELECTRIC & MFG. CO., East Pittsburgh, Pa...*pp. 160, 161*

FARM MACHINERY PARTS (Pressed Steel)
Federal Pressed Steel Co., Milwaukee, Wis.

FAUCETS, TANK WAGON
Cleveland Brass Mfg. Co., 4606 Hamilton Ave., Cleveland, Ohio
MORRISON BROS., Dubuque, Iowa..*p. 658*
United Brass Mfg. Co., Cleveland, Ohio

FEED WATER CIRCULATORS, HEATERS, REGULATORS, ETC.
(See Circulars, Heaters, Regulators, etc., Feed Water)

FEED WATER HEATERS AND PURIFIERS
(See Heaters and Purifiers, Feed Water)

FEEDERS

—Boiler
Bryant Heater & Mfg. Co., 952 East 72nd St., Cleveland, Ohio
Farnsworth Co., Conshohocken, Pa.
Foskett & Bishop Co., New Haven, Conn.
*KIELEY & MUELLER (Inc.), (''Kieley''), 34 W. 13th St., New York, N. Y...*p. 212*
Morehead Mfg. Co., 1041 Grand River Ave., Detroit, Mich.
NASON MFG. CO., 71 Fulton St., New York, N. Y...*p. 216*

—Boiler Compound
FISHER GOVERNOR CO., Marshalltown, Iowa..*p. 208*
Hawk-Eye Compound Co., Blue Island, Suburb of Chicago, Ill.
Savage, W. J. Co. (Inc.), Knoxville, Tenn.
*TABER PUMP CO., 291 Elm St., Buffalo, N. Y...*p. 581*

—Conveyor Belt
BARTLETT, C. O. & SNOW CO., Cleveland, Ohio..*p. 367*
*CALDWELL, H. W. & SON CO., 17th St. & Western Ave., Chicago, Ill...*p. 370*

—Paper
CHAMBERS BROS. CO., Philadelphia, Pa. *p. 599*

—Pulverized Coal
*FULLER-LEHIGH CO. (''Fuller-Kinyon''), Fullerton, Pa...*p. 128*
*SMIDTH, F. L. & CO., 50 Church St., New York, N. Y...*p. 604*

—Steel Apron Reciprocating
JEFFREY MFG. CO., 904 N. 4th St., Columbus, Ohio..*pp. 376, 377*

—Wood Waste
*ALLINGTON & CURTIS MFG. CO., Saginaw, Mich...*p. 554*

FELT GOODS, MECHANICAL
Albany Felt Co., Albany, N. Y.
Booth Felt Co. (Inc.), 440-450 14th St., Brooklyn, N. Y.

FERRO-MOLYBDENUM
Climax Molybdenum Co., 61 Broadway, New York, N. Y.
Tungsten Products Co. of Maryland, Baltimore, Md.
Vanadium Corporation of America, 120 Broadway, New York, N. Y.

FERRO-TITANIUM
Tungsten Products Co. of Maryland, Baltimore, Md.

FERRO-TUNGSTEN
Tungsten Products Co. of Maryland, Baltimore, Md.
Vanadium-Alloys Steel Co., Latrobe, Pa.
Vanadium Corporation of America, 120 Broadway, New York, N. Y.

FERRO-URANIUM
Standard Alloys Co., Vanadium Bldg., Pittsburgh, Pa.

FERRO-VANADIUM
Standard Alloys Co., Vanadium Bldg., Pittsburgh, Pa.
Vanadium Corporation of America, 120 Broadway, New York, N. Y.

FERRULES

—Bakelite
*CONTINENTAL FIBRE CO. (''Bakelite-Dilecto''), Newark, Del...*p. 418*

—Brass
AMERICAN BRASS CO., Waterbury, Conn. *p. 414*
Athol Pump Co., Athol, Mass.
Katzenstein, L. & Co., 358 West St., New York, N. Y.
TORRINGTON MFG. CO., Torrington, Conn. *p. 641*

—Fibre
AMERICAN VULCANIZED FIBRE CO., Wilmington, Del...*p. 417*
*CONTINENTAL FIBRE CO., Newark, Del. *p. 418*

—Fuse
Risdon Mfg. Co., Naugatuck, Conn.

—Union
Athol Pump Co., Athol, Mass.
WILLIAMS, J. H. & CO., 70 Richards St., Brooklyn, N. Y...*p. 517*

FERTILIZER MANUFACTURING MACHINERY
American Process Co., 68 William St., New York, N. Y.
*FULLER-LEHIGH CO., Fullerton, Pa...*p. 128*
JEFFREY MFG. CO., 904 N. 4th St., Columbus, Ohio..*pp. 376, 377*
POOLE ENGINEERING & MACHINE CO., Woodberry, Baltimore, Md...*pp. 316, 317*
Pratt Engineering & Machine Co., Atlanta, Ga.
Sackett, A. J., 5th Ave. & First St., Baltimore, Md.
STURTEVANT MILL CO., Harrison Sq., Boston (22), Mass...*pp. 600, 601*
Walker & Ellicott, Wilmington, Del.

Digitized by Google

FIBRE (Vulcanized)
AMERICAN VULCANIZED FIBRE CO., Wilmington, Del...*p. 417*
*CONTINENTAL FIBRE CO., Newark, Del. *p. 418*
DELAWARE HARD FIBRE CO. (Ltd.), (''D. H. Egyptian''), Wilmington, Del...*p. 419*
DIAMOND STATE FIBRE CO., Bridgeport, Pa...*p. 420*
*JOHNS-MANVILLE (Inc.), New York, N. Y...*p. 244*
Wilmington Fibre Specialty Co., Wilmington, Del.

FIBRE CASE MACHINERY
Knowlton, M. D. Co., 29 Elizabeth St., Rochester, N. Y.

FIBRE MAKING MACHINERY
Freese, E. M. & Co., Galion, Ohio

FILE SHARPENING MACHINES
Abrasive Machine Co., Irvington, N. J.

FILES
ATKINS, E. C. & CO. (Inc.), Indianapolis, Ind...*p. 506*
Delta File Works (''Delta''), Bridesburg P. O., Philadelphia, Pa.
Hayes File Co., 1986 Franklin St., Detroit. Mich.
Nicholson File Co., Providence, R. I.
*SIMONDS MFG. CO., Fitchburg, Mass...*p. 507*

FILING AND HACKSAW MACHINES (Combined)
Extensive Mfg. Co., 90 West St., New York, N. Y.

FILING CABINETS
(See Cabinets, Filing)

FILING MACHINES
ATKINS, E. C. & CO. (Inc.), Indianapolis, Ind...*p. 506*
Cochrane-Bly Co., 15 St. James Place, Rochester, N. Y.
Extensive Mfg. Co., 90 West St., New York, N. Y.
Johnson & Biddle Tool Co., 312-14 N. Main St., Elkhart, Ind.
NOBLE & WESTBROOK MFG. CO., Hartford. Conn...*p. 494*
Oliver Instrument Co. (''Oliver''), Adrian, Mich.

—Die
Barry Manufacturing Co., 515 W. Monroe St., Chicago, Ill
Extensive Mfg. Co 90 West St., New York, N. Y.
Robinson Tool Works (Inc.), Baldwin St. & Kelsey St., Waterbury, Conn.

FILLERS
—Iron and Steel
Clark Cast Steel Cement Co., Shelton, Conn.
—Barrel and Tank (Automatic)
MORRISON BROS., Dubuque, Iowa...*p. 658*

FILLETS, LEATHER
Page Belting Co., Concord, N. H.

FILTER PRESSES
(See Presses, Filter)

FILTERING MATERIALS
*CELITE PRODUCTS CO., 11 Broadway, New York, N. Y...*p. 135*
Nightingale & Childs Co., 205 Congress St., Boston, Mass.

FILTERS
—Air
*SCHUTTE & KOERTING CO., 1184 Thompson St., Philadelphia, Pa...*p. 159*
—Centrifugal
*DE LAVAL STEAM TURBINE CO., Trenton, N. J...*p. 22*
Kestner Evaporator Co, 18th & Alleghany Ave., Philadelphia, Pa.
OIL & WASTE SAVING MACHINE CO., 1509 Real Estate Trust Bldg., Philadelphia, Pa...*p. 615*
—Chemical Solution
DEVINE, J. P. CO., 1375 Clinton St., Buffalo, N. Y...*pp. 606, 607*
—Feed Water (Demulsifying)
KRAUSE, ARTHUR E., Mountain Lakes, N. J...*p. 153*
—Gravity
*BRAUN, C. F. & CO., San Francisco, Cal. *pp. 156, 157*
*PERMUTIT CO., 440 Fourth Ave., New York, N. Y...*p. 141*
Power Plant Specialty Co. (''Vater''), 1306 Monadnock Block, Chicago, Ill.
Roberts Filter Mfg. Co., 6th & Columbia Aves., Darby, Pa.
*SCAIFE, WM. B. & SONS CO., Oakmont, Pa...*pp. 143, 660*
—Mechanical
Electric Water Sterilizer & Ozone Co., Scottdale, Pa.
LOOMIS-MANNING FILTER DISTRIBUTING CO., 1439 So. 37th St., Philadelphia, Pa...*p. 140*
—Oil
Andrews, William (Inc.), 120 Liberty St., New York, N. Y.
BIGGS BOILER WORKS CO., Case Ave. & Newton St., Akron, Ohio..*p. 650*
Bonar, James & Co., 502 Park Bldg., Pittsburgh, Pa.
Bousman Mfg. Co. (Inc.), 1153 57 Plainfield Ave., N. E., Grand Rapids, Mich.
Bowser, S. F. & Co. (Inc.), Fort Wayne, Ind.
Burt Mfg. Co., Akron, Ohio
Famous Filter Co., 118 Pine St., St. Louis, Mo.
Flower, Walter L. & Co., 312-314 S. 8th St., St. Louis, Mo.
KOVEN, L. O. & BROTHER, 154 Ogden Ave., Jersey City. N. J...*p. 605*
KRAUSE, ARTHUR E., 25 Morris Ave., Mountain Lakes, N. J...*p. 153*
Liberty Mfg. Co., Frick Bldg., Pittsburgh, Pa.
Nugent, Wm. W. & Co., 146-148 W. Superior St., Chicago, Ill.
OIL & WASTE SAVING MACHINE CO., 1509 Real Estate Trust Bldg., Philadelphia, Pa...*p. 615*
Oleite Corp'n, 110 William St., New York, N. Y.
Power Plant Specialties, 219 Ruffner St., Lockland, Ohio
*RICHARDSON-PHENIX CO., 126 Reservoir Ave., Milwaukee, Wis...*pp. 248, 249*
Robertson, John F. Co., 1001 Park Bldg., Pittsburgh, Pa.
SIMS CO., Erie. Pa...*p. 152*
Turner Oil Filter Co., Niles, Mich.
—Pressure
*BRAUN, C. F. & CO., San Francisco, Cal. *pp. 156, 157*
ELMES, CHAS F. ENGINEERING WORKS, 215 N. Morgan St, Chicago, Ill...*p. 591*
*H. S. B. W.-COCHRANE CORP'N (''Cochrane''), Philadelphia, Pa...*pp. 146, 147*
LOOMIS-MANNING FILTER DISTRIBUTING CO., 1439 So. 37th St., Philadelphia, Pa...*p 140*
*PERMUTIT CO., 440 Fourth Ave., New York, N. Y...*p. 141*
Power Plant Specialty Co. (''Vater''), 1306 Monadnock Block, Chicago, Ill.
REFINITE CO. (The), Refinite Bldg., Omaha, Neb...*p. 142*

Fi

Digitized by Google

FILTERS (Continued)
Roberts Filter Mfg. Co., 6th & Columbia Aves., Darby, Pa.
*SCAIFE, WM. B. & SONS CO., Oakmont, Pa...*pp. 143, 660*

—Water
American Water Softener Co., Lehigh Ave. at Fourth St., Philadelphia, Pa.
BIGGS BOILER WORKS CO., Case Ave. & Newton St., Akron, Ohio..*p. 650*
Borromite Company of America, 105 West Monroe St., Chicago, Ill.
*CASEY-HEDGES CO., Chattanooga, Tenn. *pp. 60, 61*
Detroit Steam Appliance Co, 500 Union Trust Bldg., Detroit, Mich.
Elliott Co., Jeannette, Pa.
Glamorgan Pipe & Foundry Co, Lynchburg, Va.
Greer Chemical Co, 20 W. Jackson Blvd., Chicago, Ill.
*H. S. B. W.-COCHRANE CORP'N (''Cochrane''), Philadelphia, Pa...*pp. 146, 147*
Hygeia Filter Co., 3422-3440 Denton Ave., Detroit, Mich.
Internation Filter Co., 38 S. Dearborn St., Chicago, Ill.
Jewell Polar Co., 567 W. Van Buren St., Chicago, Ill.
KOVEN, L. O. & BROTHER, 154 Odgen Ave., Jersey City, N. J...*p. 605*
Lagonda Mfg. Co., Springfield, Ohio
LOOMIS-MANNING FILTER DISTRIBUTING CO., 1439 S. 37th St., Philadelphia, Pa...*p. 140*
New York Continental Jewell Filtration Co., East Center St., Nutley, N. J.
Oleite Corp'n, 110 William St., New York, N. Y.
*PERMUTIT CO., 440 Fourth Ave., New York, N. Y...*p. 141*
Richmond Water Softener Co., Richmond, Ind.
Roberts Filter Mfg. Co., 6th & Columbia Aves., Darby, Pa.
Ross Valve Mfg. Co., 4 Oakwood Ave., Troy, N. Y.
*SCAIFE, W. B. & SONS CO., Oakmont, Pa...*pp. 143, 660*
STEACY-SCHMIDT MFG. CO., York, Pa...*p. 612*
Watson, N A., 2016 State St., Erie, Pa.

FILTRATION PLANTS
*H. S. B. W.-COCHRANE CORP'N (''Cochrane''), Philadelphia, Pa...*pp. 146, 147*
International Filter Co., 38 S. Dearborn St., Chicago, Ill.
LOOMIS-MANNING FILTER DISTRIBUTING CO., 1439 S. 37th St., Philadelphia, Pa...*p. 140*
New York Continental Jewell Filtration Co, East Center St., Nutley, N. J.
Norwood Engineering Co., Florence, Mass.
Power Plant Specialty Co. (''Vater''), 1306 Monadnock Block, Chicago, Ill.
Reisert Automatic Water Purifying Co., 23 E. 26th St., New York
Roberts Filter Mfg. Co., 6th & Columbia Aves., Darby, Pa.
*SCAIFE, WM. B. & SONS CO., Oakmont, Pa...*pp. 143, 660*

—Municipal
Roberts Filter Mfg. Co., 6th & Columbia Aves., Darby, Pa.

FIRE FIGHTING APPARATUS
NORTHERN FIRE APPARATUS CO., 2422 University Ave., S. E., Minneapolis, Minn. *p. 577*

FIRE BRICK, HYDRANTS, SAND, ETC.
(See Brick, Hydrants, Sand, etc., Fire)

FIRE DEPARTMENT SUPPLIES
American-La France Fire Engine Co. (Inc.), Elmira, N. Y.
Barnes, Henry K. Co., 234 Devonshire St., Boston, Mass.
Morse, Andrew J. & Son (Inc.), 221 High St., Boston, Mass.
NORTHERN FIRE APPARATUS CO., 2422 University Ave., S. E., Minneapolis, Minn. *p. 577*

FIRE DOOR FIXTURES
Automatic Sprinkler Co. of America, 123 William St., New York, N. Y.
Richards-Wilcox Mfg. Co., Aurora, Ill.
Wagner Mfg. Co., Cedar Falls, Iowa

FIRE DOORS (Locomotive)
Franklin Railway Supply Co., 17 East 42nd St., New York, N. Y.

FIRE ESCAPES (Gravity Spiral Slide)
STANDARD CONVEYOR CO., North St. Paul, Minn...*p. 380*

FIRE EXTINGUISHERS
American-La France Fire Engine Co. (Inc.), Elmira, N. Y.
Automatic Sprinkler Co. of America, 123 William St., New York, N. Y.
*JOHNS-MANVILLE (Inc.), New York, N. Y...*p. 244*

FIRE HOSE MACHINERY
ROYLE, JOHN & SONS, Paterson, N. J...*p. 643*

FIRE TUBE BOILERS
(See Boilers, Return and Vertical Tubular)

FITTINGS
—Acid
*U. S. CAST IRON PIPE & FOUNDRY CO., Burlington, N. J...*pp. 232, 233*

—Ammonia
Baker Ice Machine Co., Omaha, Neb.
Continental Machinery Co., 111 West Monroe St., Chicago, Ill.
*DE LA VERGNE MACHINE CO., 1123 E. 138th St., New York, N. Y...*p. 40*
KELLY & JONES CO., Greensburg, Pa...*pp. 182, 183*
*VILTER MFG. CO., 1194-1196 Clinton St., Milwaukee, Wis...*pp. 16, 17*
*VOGT, HENRY MACHINE CO., Louisville, Ky...*pp. 632, 633*
WILLIAMS, J. H. & CO., 70 Richards St., Brooklyn, N. Y...*p. 517*
YORK MFG. CO., York, Pa...*p. 631*

—Cast Iron (Bell & Spigot)
CLOW, JAMES B. & SONS, 534 So. Franklin St., Chicago, Ill...*pp. 230, 231*
LYNCHBURG FOUNDRY CO., Lynchburg, Va...*p. 229*
Pittsburgh Valve & Fittings Co, Barberton, Ohio

—Compression
*RICHARDSON-PHENIX CO., 126 Reservoir Ave., Milwaukee, Wis...*pp. 248, 249*

—Digester
Carthage Machine Co., Carthage, N. Y.

—Drainage (Cast Iron)
*CASEY-HEDGES CO., Chattanooga, Tenn. *pp. 60, 61*
*CENTRAL FOUNDRY CO. (''F & W''), 90 West St., New York, N. Y...*p. 228*
CLOW, JAMES B. & SONS, 534 S. Franklin St., Chicago, Ill...*pp. 230, 231*
*CRANE CO., 836 S. Michigan Ave., Chicago, Ill...*pp. 170, 171, 172, 173*
KELLY & JONES CO., Greensburg, Pa...*pp. 182, 183*
Red Wing Iron Works, Red Wing, Minn.
STOCKHAM PIPE & FITTINGS CO., Birmingham, Ala...*p. 237*

Digitized by Google

*U. S. CAST IRON PIPE & FOUNDRY CO., Burlington, N. J...*pp. 232, 233*

—Drainage (Malleable Iron)
*CRANE CO., 836 S. Michigan Ave., Chicago, Ill...*pp. 170, 171, 172, 173*

—Flanged
AMERICAN DISTRICT STEAM CO., North Tonawanda, N. Y...*p. 242*
Central Station Steam Co., 2910 East Woodbridge St., Detroit, Mich.
CLOW, JAMES B. & SONS,534 So. Franklin St., Chicago, Ill...*pp. 230, 231*
*CRANE CO., 836 S. Michigan Ave., Chicago, Ill...*pp. 170, 171, 172, 173*
Direct Separator Co. Syracuse, N. Y.
*DOUGHERTY, M. J. CO., 25th & Washington Ave., Philadelphia, Pa...*p. 234*
Essex Foundry, Murray St. & Avenue D., Newark, N. J.
ILLINOIS MALLEABLE IRON CO., 180-25 Diversey Parkway, Chicago, Ill...*p. 241*
Limert, Geo. B. & Co., 570 Fulton St., Chicago, Ill.
Lumsden & Van Stone Co., 426 First St., South Boston. Mass.
*LUNKENHEIMER CO., Cincinnati, Ohio. *pp. 184, 185, 186, 187, 188, 189*
LYNCHBURG FOUNDRY CO., Lynchburg, Pa...*p. 229*
Massillon Iron & Steel Co., Massillon, Ohio
National Valve & Mfg. Co., 3101 Liberty Ave., Pittsburgh, Pa.
Pittsburgh Engineering Co, Jeannette, Pa.
*PITTSBURGH VALVE FOUNDRY & CONSTRUCTION CO., P. O. Box 1016, Pittsburgh, Pa...*pp. 192, 193*
STOCKHAM PIPE & FITTINGS CO, Birmingham, Ala...*p. 237*
*U. S. CAST IRON PIPE & FOUNDRY CO., Burlington, N. J...*pp. 232, 233*
Shaw-Kendall Engineering Co., 120-130 So. Superior St., Toledo, Ohio
Thompson, J. & Co., Van Horn & Sophia Sts., Philadelphia, Pa.
Victory Mfg. Co., Monadnock Bldg., San Francisco, Cal.

—Flanged (Steel)
*CRANE CO., 836 S. Michigan Ave., Chicago, Ill...*pp. 170, 171, 172, 173*
Edward Valve & Mfg. Co., East Chicago, Ind.
KELLY & JONES CO., Greensburg, Pa. *pp. 182, 183*
Pittsburgh Piping & Equipment Co., 35th & Charlotte Sts., Pittsburgh, Pa.
*PITTSBURGH VALVE, FOUNDRY & CONSTRUCTION CO., P. O. Box 1016...*pp. 192, 193*
Power Piping Co., Beaver & Western Ave., Pittsburgh, Pa.
*READING VALVE & FITTINGS CO., Reading Division, Reading, Pa...*pp. 238, 239*
*VOGT, HENRY MACHINE CO., Louisville, Ky...*pp. 632, 633*

—Hard Rubber
*JOHNS-MANVILLE (Inc.), New York, N. Y...*p. 244*

—Hydraulic
BUCKEYE IRON & BRASS WORKS, Dayton, Ohio...*p. 168*
BURROUGHS, CHARLES CO. (The), Newark, N. J...*p. 590*
*CRANE CO., 836 S. Michigan Ave., Chicago, Ill...*pp. 170, 171, 172, 173*
ELMES, CHAS. F. ENGINEERING WORKS, 215 N. Morgan St., Chicago, Ill...*p. 591*
High Pressure Fitting & Valve Co., 72-74 Putnam St., Paterson, N. J.
*HOMESTEAD VALVE MFG. CO., P. O. Box 1754, Pittsburgh, Pa...*p. 177*
HYDRAULIC PRESS MFG. CO. (The), Mount Gilead, Ohio...*p. 593*
JARECKI MFG. CO., Erie, Pa...*pp. 178, 179*
KELLY & JONES CO., Greensburg, Pa...*pp. 182, 183*
METALWOOD MFG. CO., Detroit, Mich...*p. 594*
*PITTSBURGH VALVE, FOUNDRY & CONSTRUCTION CO., P. O. Box 1016, Pittsburgh, Pa...*pp. 192, 193*
*READING VALVE & FITTINGS CO., Reading Division, Reading, Pa...*pp. 238, 239*
ROBERTSON, JOHN & CO., 133 Water St., Brooklyn, N. Y...*p. 595*
*U. S. CAST IRON PIPE & FOUNDRY CO., Burlington, N. J...*pp. 232, 233*
WATSON-STILLMAN CO., 35 Church St., New York, N. Y...*p. 596*

—Indicator
*CROSBY STEAM GAGE & VALVE CO., 40 Central St., Boston, Mass...*pp. 202, 208*

—Malleable (Screwed)
CLOW, JAMES B. CO., 534 So. Franklin St., Chicago, Ill...*pp. 230, 231*

—Manhole
*CENTRAL FOUNDRY CO., 90 West St., New York, N. Y...*p. 228*
GLASGOW IRON CO., Pottstown, Pa...*p. 99*

—Pipe
AMERICAN DISTRICT STEAM CO. ("Adsco"), North Tonawanda, N. Y...*p. 242*
Bridgman Bros. Co., 120 South 30th St., Philadelphia, Pa.
*BUILDERS IRON FOUNDRY ("Globe Special"), Providence, R. I...*p. 277*
CLOW, JAMES B. & SONS, 534 So. Franklin St., Chicago, Ill...*pp. 230, 231*
*CRANE CO., 836 S. Michigan Ave., Chicago, Ill...*pp. 170, 171, 172, 173*
Detroit Brass & Malleable Works, 331 Holden Ave., Detroit, Mich.
Donaldson Iron Co., Emaus, Lehigh Co., Pa.
*DOUGHERTY, M. J. CO., 25th & Washington Ave., Philadelphia, Pa...*p. 234*
Essex Foundry, Murray St. & Avenue D., Newark. N. J.
Hershey Machine & Fdry. Co., Manheim, Pa.
High Pressure Fitting & Valve Co., 72-74 Putnam St., Paterson, N. J.
ILLINOIS MALLEABLE IRON CO., 1801-1825 Diversey Parkway, Chicago, Ill...*p. 241*
JARECKI MFG. CO., Erie, Pa...*pp. 178, 179*
Jefferson Union Co., Lexington, Mass.
KELLY & JONES CO., Greensburg, Pa...*pp. 182, 183*
Krahn Mfg. Co., 590 Clinton St., Milwaukee, Wis.
*LUNKENHEIMER CO., Cincinnati, Ohio *pp. 184, 185, 186, 187, 188, 189*
McMann & Taylor Co., 104-106 John St., New York, N. Y.
McNab & Harlin Mfg. Co., Paterson, N. J.
McRae & Roberts Co., 211 Campbell Ave., Detroit, Mich.
MALLEABLE IRON FITTINGS CO. ("Mif"), Branford, Conn...*p. 236*
NATIONAL SUPPLY CO., Toledo, Ohio...*pp. 648, 649*
Pancoast, Henry B. & Co., 940-962 N. Front St., Philadelphia, Pa.
Pittsburgh Engineering Co., Jeannette, Pa.
*PITTSBURGH VALVE, FOUNDRY & CONSTRUCTION CO., P. O. Box 1016, Pittsburgh, Pa...*pp. 192, 193*
*READING VALVE & FITTINGS CO., Reading Division, Reading, Pa...*pp. 238, 239*

Fi

Digitized by Google

Standard Cast Iron Pipe & Foundry Co., Bristol, Pa.
STOCKHAM PIPE & FITTINGS CO., Birmingham, Ala...*p. 237*
Thompson, J. & Co., Van Horn & Sophia Sts., Philadelphia, Pa.
*U. S. CAST IRON PIPE & FOUNDRY CO., Burlington, N. J...*pp. 232, 233*
Victory Mfg. Co., Monadnock Bldg., San Francisco, Cal.
Walworth Mfg. Co., First & O. Sts., South Boston, Mass.
Wilfert, John Co, 258 Broadway, New York, N. Y.

—Railing
*CRANE CO., 836 S. Michigan Ave.. Chicago, Ill...*pp. 170, 171, 172, 173*
MALLEABLE IRON FITTINGS CO., Branford, Conn...*p. 236*
*PITTSBURGH VALVE, FOUNDRY & CONSTRUCTION CO., P. O. Box 1016. Pittsburgh, Pa...*pp. 192, 193*

—Steel
BUCKEYE IRON & BRASS WORKS, Dayton, Ohio..*p. 168*
*CRANE CO., 836 S. Michigan Ave., Chicago, Ill...*pp. 170, 171, 172, 173*
*DOUGHERTY, M. J. CO., 25th & Washington Ave., Philadelphia, Pa...*p. 234*
Edward Valve & Mfg. Co., East Chicago, Ind.
KELLY & JONES CO., Greensburg, Pa...*pp. 182, 183*
*LUNKENHEIMER CO., Cincinnati, Ohio *pp. 184, 185, 186, 187, 188, 189*
MALLEABLE IRON FITTING CO., Branford, Conn...*p. 236*
METALWOOD MFG. CO., Detroit, Mich...*p. 594*
*PITTSBURGH VALVE, FOUNDRY & CONSTRUCTION CO., P. O. Box 1016, Pittsburgh, Pa...*pp. 192, 193*
Reading Steel Casting Co., Reading, Pa.
*READING VALVE & FITTINGS CO., Reading Division, Reading, Pa...*pp. 238, 239*
Simmons, John Co., 104-110 Center St., New York, N. Y.
*VOGT, HENRY MACHINE CO., Louisville, Ky...*pp. 632, 633*

—Union
*CRANE CO., 836 S. Michigan Ave., Chicago, Ill...*pp. 170, 171, 172, 173*
Dart, E. M. Mfg. Co., 134 Thurbers Ave., Providence, R. I.
KELLY & JONES CO., Greensburg, Pa...*pp. 182, 185*
*PITTSBURGH VALVE, FOUNDRY & CONSTRUCTION CO., P. O. Box 1016, Pittsburgh, Pa...*pp. 192, 193*

FLANGES

—Cast Iron
Bard Union Co. (Inc.), Norwich, Conn.
*CRANE CO., 836 S. Michigan Ave., Chicago, Ill...*pp. 170, 171, 172, 173*
*DOUGHERTY, M. J. CO., 25th & Washington Ave, Philadelphia, Pa...*p. 234*
Essex Foundry, Murray St. & Avenue D, Newark, N. J.
Hershey Machine & Foundry Co., Manheim, Pa.
Pittsburgh Engineering Co., Jeanette, Pa.
*JENKINS BROS., 80 White St., New York, N. Y...*pp. 180, 181*
*LUNKENHEIMER CO., Cincinnati, Ohio *pp. 184, 185, 186, 187, 188, 189*
METALWOOD MFG. CO., Detroit, Mich...*p. 594*
*PITTSBURGH VALVE FOUNDRY & CONSTRUCTION CO., P. O. Box 1016, Pittsburgh, Pa...*pp. 192, 193*

—Cast Steel
*JENKINS BROS., 80 White St., New York, N. Y...*pp. 180, 181*
KELLY & JONES CO., Greensburg, Pa...*pp. 182, 183*
*LUNKENHEIMER CO., Cincinnati, Ohio *pp. 184, 185, 186, 187, 188, 189*
*PITTSBURGH VALVE, FOUNDRY & CONSTRUCTION CO., P. O. Box 1016, Pittsburgh, Pa...*pp. 192, 193*
*READING VALVE & FITTINGS CO., Reading Division, Reading, Pa...*pp. 238, 239*
*VOGT, HENRY MACHINE CO., Louisville, Ky...*pp. 632, 633*

—Forged Steel
American Spiral Pipe Works, Box 485, Chicago, Ill.
Ballwood Co., 30 Church St., New York, N. Y.
Cann & Saul Steel Co., 516 Commerce St., Philadelphia, Pa.
*CRANE CO., 836 S. Michigan Ave., Chicago, Ill...*pp. 170, 171, 172, 173*
*DOUGHERTY, M. J. CO., 25th & Washington Ave., Philadelphia, Pa...*p. 234*
*JENKINS BROS., 80 White St., New York, N. Y...*pp. 180, 181*
*LUNKENHEIMER CO., Cincinnati, Ohio *pp. 184, 185, 186, 187, 188, 189*
Philadelphia Steel & Iron Co., 1008 Commercial Trust Bldg., Philadelphia, Pa.
*PITTSBURGH VALVE FOUNDRY & CONSTRUCTION CO., P. O. Box 1016, Pittsburgh, Pa...*pp. 192, 193*
Scully Steel & Iron Co., P. O. Box 814, Chicago, Ill.
Standard Spiral Pipe Works, 4801 S. Rockwell St., Chicago, Ill.
*VOGT, HENRY, MACHINE CO., Louisville, Ky...*pp. 632, 633*
VULCAN STEAM FORGING CO., 247 Rano St., Buffalo, N. Y...*p. 433*
WILLIAM, J. H. & CO., 70 Richards St., Brooklyn, N. Y...*p. 517*

—Pressed Steel
AMERICAN PULLEY CO., 4200 Wissahickon Ave., Philadelphia, Pa...*p. 322*
GLASGOW IRON CO., Pottstown, Pa...*p. 99*
*KEELER, E. CO., Williamsport, Pa...*p. 69*

FLANGING
GLASGOW IRON CO., Pottstown, Pa...p. 99

FLANGING MACHINES
*BLISS. E. W. CO., Brooklyn, N. Y...*pp. 438, 439*

—Pneumatic
McCABE MFG. CO., Lawrence, Mass...*p. 445*

FLASKS (Foundry)
American Foundry Equipment Co., 366 Madison Ave., New York, N. Y.

FLEXIBLE JOINTS, SHAFTING, TUBING, ETC.
(See Joints, Shafting, Tubing, etc., Flexible)

FLEXIBLE SHAFT OUTFITS
Plank Flexible Shaft Machine Co., Grand Rapids, Mich.
WHITE, S. S. DENTAL MFG. CO., 84 Market St., New York, N. Y...*p. 359*

FLOATS, COPPER
Hercules Float Works ("Hercules"), 200 Franklin St., Springfield, Mass.
Harris, Arthur & Co., 212 Curtis St., Chicago, Ill.
*Reliance Gauge Column Co. ("Reliance"), 5902 Carnegie Ave., Cleveland, Ohio
Roberts Steam Specialty Co. (The), 5318 St. Clair Ave., Cleveland, Ohio

FLOOD LIGHTS
*GENERAL ELECTRIC CO., Schenectady, N. Y...*pp. 18, 19, 20, 21*

Digitized by Google

FLOOR ARMOR
IRVING IRON WORKS CO., 3rd St. & Dutchkill Creek, Long Island City, N. Y. *p. 662*

FLOOR HARDENERS (Concrete)
Master Builders Co., 1836 Euclid Ave., Cleveland, Ohio
Sonneborn, L. Sons (Inc.), 262 Pearl St., New York, N. Y.
Standard Chemical Corp'n (''Amalgatex''), Kalamazoo, Mich.
Trus-Con Laboratories, Detroit, Mich.

FLOOR PLATES
American Abrasive Metals Co. (''Feralun''), 50 Church St., New York, N. Y.
BUDD GRATE CO., 2013 E. Letterly St., Philadelphia, Pa...*p. 123*
*CRANE CO., 836 S. Michigan Ave., Chicago, Ill...*pp. 170, 171, 172, 173*
IRVING IRON WORKS (''Subway''), 3rd St. & Dutchkill Creek, Long Island City, N. Y...*p. 662*
KELLY & JONES CO., Greensburg, Pa...*pp. 182, 183*
Ryerson, Joseph T. & Son (''Firmtread'') 16th & Rockwell Sts., Chicago, Ill.
Scully Steel & Iron Co., P. O. Box 814, Chicago, Ill.
*U. S. CAST IRON PIPE & FOUNDRY CO., Burlington, N. J...*pp. 232, 233*
*WASHBURN & GRANGER (Inc.), 50 Church St., New York, N. Y...*p. 127*

FLOOR SCRUBBING MACHINERY
Barry Mfg. Co., 515 W. Monroe St., Chicago, Ill.

FLOOR STANDS
*CRANE CO., 836 S. Michigan Ave., Chicago, Ill...*pp. 170, 171, 172, 173*
*FALLS CLUTCH & MACHINERY CO., Cuyahoga Falls, Ohio...*p. 330*
*HILL CLUTCH CO., Cleveland, Ohio...*p. 331*
KELLY & JONES CO., Greensburg, Pa...*pp. 182, 183*
*LUNKENHEIMER CO., Cincinnati, Ohio...*pp. 184, 185, 186, 187, 188, 189*
*PITTSBURGH VALVE, FOUNDRY & CONSTRUCTION CO., P. O. Box 1016, Pittsburgh, Pa...*pp. 192, 193*
*WOOD'S T. B. SONS CO., Chambersburg, Pa...*pp. 334, 335*

FLOORING
—Acid Proof
Barber Asphalt Paving Co., 1900 Land Title Bldg., Philadelphia, Pa.
—Asphalt Mastic
*JOHNS-MANVILLE (Inc.), New York, N. Y...*p. 244*
Warren Bros. Co., 9 Cambridge St., Boston, Mass.
—Block (Asphalt)
HASTINGS PAVEMENT CO., 25 Broad St., New York, N. Y...*p. 661*
—Block (Wood)
Jennison-Wright Co. (''Kreolite''), 2463 Broadway, Toledo, Ohio
—Metallic
IRVING IRON WORKS CO. (''Subway''), 3rd St. & Dutchkill Creek, Long Island City, N. Y...*p. 662*
—Open
IRVING IRON WORKS CO., 3rd St. & Dutchkill Creek, Long Island City, N. Y. *p. 662*

FLOUR MILL MACHINERY
*ALLIS-CHALMERS MFG. CO., Milwaukee, Wis...*pp. 28, 29*
Beall Improvement Co. (Inc.), Decatur, Ill.
Sprout, Waldron & Co., Muncy, Pa.
WELLER MFG. CO., 1820-1856 N. Kostner Ave., Chicago, Ill...*p. 381*
Wolf Co., Chambersburg, Pa.

FLUE CLEANERS
Cleveland Flue Cleaner Mfg. Co. (''A. & D.''), Cleveland, Ohio
Underwood, H. B. Corp'n, 1025 Hamilton St., Philadelphia, Pa.

FLUE CUTTERS
(See Cutters, Boiler Tube)

FLUE WELDERS
Draper Mfg. Co., 2417 Wright St., Port Huron, Mich.

FLUES, SMOKE
(See Breechings)

FLUX (Welding)
General Welding Co. (''Ilead''), 355 14th St., Hoboken, N. J.
Metals Welding Co., 4400 Perkins Ave., Cleveland, Ohio
QUASI-ARC WELDTRODE CO. (Inc.), 114 Hudson Ave., Peekskill, N. Y...*p. 538*
WILSON WELDER & METALS CO. (Inc.), 259 36th St., Brooklyn, N. Y...*p. 537*

FLY WHEELS
BASS FOUNDRY & MACHINE CO., Fort Wayne, Ind...*p. 57*
*BROWN, A. & F. CO., 79 Barclay St., New York, N. Y...*p. 303*
*CALDWELL, H. W. & SON CO., 17th & Western Ave., Chicago, Ill...*p. 370*
DODGE SALES & ENGINEERING CO., Mishawaka, Ind...*pp. 42, 43, 326, 327, 328, 329*
*FALLS CLUTCH & MACHINERY CO., Cuyahoga Falls, Ohio...*p. 330*
*HILL CLUTCH CO., Cleveland, Ohio...*p. 331*
MURRAY IRON WORKS CO., Burlington, Iowa...*pp. 80, 81*
POOLE ENGINEERING & MACHINE CO., Woodberry, Baltimore, Md...*pp. 316, 317*
Pyott Foundry Co., 328 N. Sangamon St., Chicago, Ill.
WELLER MFG. CO., 1820-1856 N. Kostner Ave., Chicago, Ill...*p. 381*
*WOODS, T. B. SONS CO., Chambersburg, Pa...*pp. 334, 335*

FOLDING MACHINES (Paper)
CHAMBERS BROS. CO., Philadelphia, Pa. *p. 599*
Dexter Folder Co., 28 W. 23rd St., New York, N. Y.

FORGES
AMERICAN GAS FURNACE CO., Elizabeth, N. J...*p. 527*
*BRADLEY, C. C. & SON (Inc.), Syracuse, N. Y...*p. 446*
Buffalo Forge Co., 490 Broadway, Buffalo, N. Y.
Champion Blower & Forge Co., Lancaster, Pa.
STURTEVANT, B. F. CO., Hyde Park, Boston, Mass...*p. 106*
—Gas
AMERICAN GAS FURNACE CO., Elizabeth, N. J...*p. 527*
ANTHONY CO., 138 West Ave., Long Island City, N. Y...*p. 530*
—Hand, Portable
ANTHONY CO., 138 West Ave., Long Island City, N. Y...*p. 530*
Canedy-Otto Mfg. Co., Chicago Heights, Ill.
Star Car & Foundry Co., Huntington, W. Va.
—Oil
ANTHONY CO., 138 West Ave., Long Island City, N. Y...*p. 530*
*BEST, W. N. FURNACE & BURNER CORP'N (''Calorex''), 11 Broadway, New York, N. Y...*pp. 130, 531*

Digitized by Google

FORGES (Continued)
Fisher, Alfred Furnace Co., 803 W. Madison St., Chicago, Ill.
Naudain, John E., Sparrows Point, Md.
*ROCKWELL, W. S. CO., 50 Church St., New York, N. Y...*p. 529*

—Rivet
ANTHONY CO., 138 West Ave., Long Island City, N. Y...*p. 530*
Eclipse Fuel Engrg. Co., Rockford, Ill.
Hauck Mfg. Co., 127 10th St., Brooklyn, N. Y.
Mahr Mfg. Co., 1300 N. E. Quincy St., Minneapolis, Minn.
*ROCKWELL, W. S. CO., 50 Church St., New York, N. Y...*p. 529*

—Rivet, Portable
Furness Bros. Co. ("Cumming"), 1615 W. Walnut St., Chicago, Ill.

FORGING AND UPSETTING MACHINES
Ajax Mfg. Co., 3830 Lakeside Ave., Cleveland, Ohio

FORGING MACHINES
Billings & Spencer Co., Hartford, Conn.
Howard Iron Works, 285 Chicago St., Buffalo, N. Y.
National Machinery Co., Tiffin, Ohio
Pennsylvania Forge Co., Bridesburg, Philadelphia, Pa.
Scranton & Co., 42 Church St., New Haven Conn.
Williams, White & Co., Moline, Ill.

FORGINGS
*ALLIS-CHALMERS MFG. CO., Milwaukee, Wis...*pp. 28, 29*
Allison & Co., Chester, Pa.
Bellevue Industrial Furnace Co., 703 Bellevue Ave., Detroit, Mich.
Bradley, Osgood Car Co., Worcester, Mass.
Camden Forge Co., Mt. Ephriam Ave., Camden, N. J.
Champion Machine & Forging Co., 3695 E 78th St., Cleveland, Ohio
DeLaney Forge & Iron Co. (Inc.), 300 Perry St., Buffalo, N. Y.
Electro Steel Co. (Inc.), 206 Jones Bldg. Pittsburgh, Pa.
Erie Forge Co., Erie Forge & Steel Co., Erie, Pa.
General Drop Forge Co. (Inc.), 1738 Elmwood Ave., Buffalo, N. Y.
Heppenstall Forge & Knife Co., 4620 Hatfield St., Pittsburgh, Pa.
International High Speed Steel Co., 99 Nassau St., New York, N. Y.
Jersey Forging Works, 16th St. & Jersey Ave., Jersey City, N. J.
Liggett Spring & Axle Co., Monongahela, Pa.
Michigan Bolt & Nut Works, Detroit, Mich.
Midvale Steel & Ordnance Co., Cambria Steel Co., Widener Bldg., Philadelphia, Pa.
MUELLER METALS CO., Port Huron, Mich. *p. 428*
National Lock Washer Co., Newark, N. J.
Schuylkill Forge Co., Luzerne & 3rd Sts., Philadelphia, Pa.
Steel Forgings Co., Brotherton Rd., Cincinnati, Ohio
TRANSUE & WILLIAMS STEEL FORGING CORP'N, Alliance, Ohio... *p. 432*
VULCAN STEAM FORGING CO., 247 Rano St., Buffalo, N. Y...*p. 433*

—Brass
MUELLER METALS CO., Port Huron, Mich. *p. 428*

—Copper
General Drop Forge Co. (Inc.), 1738 Elmwood Ave Buffalo, N. Y.
Rome Mfg. Co., Rome, N. Y.

—Bronze
AMERICAN MANGANESE BRONZE CO., Holmesburg, Philadelphia, Pa...*p. 415*
MUELLER METALS CO., Port Huron, Mich. *p. 428*

—Crank
VULCAN STEAM FORGING CO., 247 Rano St., Buffalo, N. Y...*p. 433*
Wyman-Gordon Co., Worcester, Mass.

—Die Makers'
VULCAN STEAM FORGING CO., 247 Rano St., Buffalo, N. Y...*p. 433*

—Drawn
*AMERICAN FORGE & MACHINE CO., Canton, Ohio..*pp. 430, 431*

—Drop
*AMERICAN FORGE & MACHINE CO., Canton, Ohio..*pp. 430, 431*
BEARINGS CO. OF AMERICA, Lancaster, Pa...*p. 341*
Bethlehem Steel Co., Bethlehem, Pa.
Billings & Spencer Co., Hartford, Conn.
Bonney Forge & Tool Works, Allentown, Pa.
*BRADLEY, C. C. & SON (Inc.), Syracuse, N. Y...*p. 446*
Brennan, John & Co., 24th St. & M. C. R. R., Detroit, Mich.
Champion Machine & Forging Co., 3695 E. 78th St., Cleveland, Ohio
Cleveland City Forge & Iron Co., 45th St. & Lakeside Ave., Cleveland, Ohio
COLUMBUS BOLT WORKS CO., Columbus, Ohio..*p. 522*
Commercial Drop Forge Co., Warren, Pa.
Duff Mfg. Co., Box 555, N. S., Pittsburgh, Pa.
Frost Gear & Forge Co., Jackson, Mich.
General Drop Forge Co. (Inc.), 1738 Elmwood Ave., Buffalo, N. Y.
Great Lake Forge Co., 14 E. Jackson Blvd., Chicago, Ill.
Harley Co., Page Blvd., Springfield, Mass.
Hay-Budden Mfg. Co., 254 N. Henry St., Brooklyn, N. Y.
Henry & Allen, Auburn, N. Y.
Keystone Drop Forge Works, Chester, Pa.
Kraeuter & Co. (Inc.), 585 18th Ave., Newark, N. J.
Ladish Drop Forge Co., Cudahy, Wis.
LAKESIDE FORGE CO., Erie, Pa...*p. 429*
Moore Drop Forging Co., Springfield, Mass.
NEWHALL CHAIN FORGE & IRON CO., 90 West St., New York, N. Y...*p. 410*
Ohio Forge Co., 2955 E. 92nd St., Cleveland, Ohio
Oliver Iron & Steel Co., S. 10th & Muriel Sts., Pittsburgh, Pa.
Pettis, W. W. Co., Suite 416-17, First National Bank Bldg., Cincinnati, Ohio
Plumb, Fayette R., Bridesburg P. O., Philadelphia, Pa.
Pollak Steel Co., Cincinnati, Ohio
Rome Mfg. Co., Rome, N. Y.
Savage Arms Corp'n, 50 Church St., Sharon, Pa.
Standard Forging Co., 80 E. Jackson Blvd., Chicago, Ill.
Standard Spiral Pipe Works, 4801 S. Rockwell St., Chicago, Ill.
Steel Car Forge Co., Frick Bldg., Pittsburgh, Pa.
TRANSUE & WILLIAMS STEEL FORGING CORP'N, Alliance, Ohio...*p. 432*
Union Drop Forge Co., 358 W. Grand Ave., Chicago, Ill.
Union Switch & Signal Co., Swissvale, Pa.
Universal Machine Co. Bowling Green, Ohio
*VOGT, HENRY MACHINE CO., Louisville, Ky. *pp. 632, 633*
Western Drop Forge Co., Marion, Ind.
WILLIAMS, J. H. & CO., 70 Richards St., Brooklyn, N. Y...*p. 517*
Winchester Repeating Arms Co., New Haven, Conn.
Wyman-Gordon Co., Worcester, Mass.

Digitized by Google

—Hammered
*AMERICAN FORGE & MACHINE CO., Canton, Ohio..*pp. 430, 431*
*BRADLEY, C. C. & SON (Inc.), Syracuse, N. Y. *p. 446*
Camden Forge Co., Mt. Ephraim Ave., Camden, N. J.
Cann & Saul Steel Co., 516 Commerce St., Philadelphia, Pa.
Dyson, Joseph & Son, 4125 St. Clair Ave., Cleveland, Ohio
Ladish Drop Forge Co., Cudahy, Wis.
NEWHALL CHAIN FORGE & IRON CO., 90 West St., New York, N. Y...*p. 410*
Nilson-Miller Co., 1306 Hudson St., Hoboken, N. J.
Ohio Forge Co., 2955 E. 92nd St., Cleveland, Ohio
Pettis, W. W. Co., Suite 416-17, First National Bank Bldg., Cincinnati, Ohio
Steel Forgings Co., Bootherton Rd., Cincinnati, Ohio
Tioga Steel & Iron Co., 52nd & Gray's Ave., Philadelphia, Pa.
VULCAN STEAM FORGING CO., 247 Rano St., Buffalo, N. Y...*p. 433*
Winchester Repeating Arms Co., New Haven, Conn.

—Hand
Dyson, Joseph & Son, 5125 St. Clair Ave., Cleveland, Ohio
E. C. Mfg. Co., 546-548 W. Harrison St., Chicago, Ill.
Ladish Drop Forge Co., Cudahy, Wis.
NEWHALL CHAIN FORGE & IRON CO., 90 West St., New York, N. Y...*p. 410*
VULCAN STEAM FORGING CO., 247 Rano St., Buffalo, N. Y...*p. 433*
Winchester Repeating Arms Co., New Haven, Conn.

—Heavy
DeLaney Forge & Iron Co. (Inc.), 300 Perry St., Buffalo, N. Y.
Pollak Steel Co., Cincinnati, Ohio
Standard Forging Co., 80 E. Jackson Blvd., Chicago, Ill.

—Hollow Steel
American Hollow Boring Co., Erie, Pa.
Camden Forge Co., Mt. Ephraim, Camden, N. J.
Elyria Machine Co., Elyria, Ohio

—Hydraulic
*AMERICAN FORGE & MACHINE CO., Canton, Ohio..*pp. 430, 431*

—Iron
Alloy Parts Mfg. Co., Canton, Ohio
Bonney Forge & Tool Works, Allentown, Pa.
*BRADLEY, C. C. & SON (Inc.), Syracuse, N. Y...*p. 446*
Braeburn Steel Co., 366 Madison Ave., New York, N. Y.
Camden Forge Co., Mt. Ephraim Ave., Camden, N. J.
Cann & Saul Steel Co., 516 Commerce St., Philadelphia, Pa.
Commercial Drop Forge Co., Warren, Pa.
DeLaney Forge & Iron Co. (Inc.), 300 Perry St., Buffalo, N. Y.
Gale Mfg. Co., Albion, Mich.
Hammond Steel Co. (Inc.), 2600 Milton Ave., Syracuse, N. Y.
Hay-Budden Mfg. Co., 254 N. Henry St., Brooklyn, N. Y.
HOLMES, ROBT. & BROS. (Inc.), Danville, Ill...*pp. 386, 387*
Johnson, J. R. & Co. (Inc.), P. O. Box 515, Richmond, Va.
Lombard Iron Work & Supply Co., Augusta, Ga.
McDougall & Potter Co., 606-612 W. 55th St., New York, N. Y.
Mt. Vernon Car Mfg. Co., Mt. Vernon, Ill.
NEWHALL CHAIN FORGE & IRON CO., 90 West St., New York, N. Y.*p. 410*
Ohio Forge Co., 2955 E. 92nd St., Cleveland, Ohio
Philadelphia Steel & Iron Co., 1008 Commercial Trust Bldg., Philadelphia, Pa.
Pittsburgh Forge & Iron Co., 1003 Penn Ave., Pittsburgh, Pa.
Reading Iron Co., Reading, Pa.
Standard Steel Works Co., 500 N. Broad St., Philadelphia, Pa.
Steel Car Forge Co., Frick Bldg., Pittsburgh, Pa.
Strait, H. N. Mfg. Co., Kansas City, Mo.
Wharton, Wm., Jr., & Co. (Inc.), P. O. Box 124, Easton, Pa.
WILLIAMS, J. H. & CO., 70 Richards St., Brooklyn, N. Y...*p. 517*

—Monel Metal
Monel Metal Products Corp'n, 67 Wall St., New York, N. Y...*p. 406*

—Steel
Brennan, John & Co., 24th St., & M. C. R. R., Detroit, Mich.
Commercial Drop Forge Co., Warren, Pa.
Electric Steel & Forge Co., 6607 Grant Ave., Cleveland, Ohio
Pennsylvania Forge Co., Bridesburg, Philadelphia, Pa.
Tacony Steel Co., Franklin Bank Bldg., Philadelphia, Pa.
VULCAN STEAM FORGING CO., 247 Rano St., Buffalo, N. Y...*p. 433*

—Tool Steel
VULCAN STEAM FORGING CO., 247 Rano St., Buffalo, N. Y...*p. 433*

FORMING MACHINES
BERTSCH & CO., Cambridge City, Ind...*p. 442*
*BLISS, E. W. CO., Brooklyn, N. Y...*pp. 438, 439*
CLEVELAND AUTOMATIC MACHINE CO., Cleveland, Ohio..*p. 462*

—Cold Rolled
Yoder Co., Walworth Ave. at W. 58th St., Cleveland, Ohio

—Hydraulic
HYDRAULIC PRESS MFG. CO., Mount Gilead, Ohio..*p. 593*

FORMS, STEEL (Concrete Construction)
Blaw-Knox Co., P. O. Box 915, Pittsburgh, Pa.

FOUNDRY EQUIPMENT
American Foundry Equipment Co., 366 Madison Ave., New York, N. Y.
ANTHONY CO., 138 West Ave., Long Island City, N. Y...*p. 530*
Arcade Mfg. Co., Freeport, Ill.
Berkshire Mfg. Co., 1101 Power Ave., Cleveland, Ohio
Central Foundry Supply Co., P. O. Box 495, Columbus, Ohio
Champion Foundry & Mach. Co., 2419 W. 14th St., Chicago, Ill.
Dayton Molding Machine Co., Dayton, Ohio
Federal Foundry Supply Co., Cleveland, Ohio
Grimes Molding Machine Co., 5738 Hastings St., Detroit, Mich.
Herman Pneumatic Machine Co., Pittsburgh, Pa.
Hill & Griffith Co., 1262 State Ave., Cincinnati, Ohio
Modern Pattern & Machine Co., 451 Monroe Ave., Detroit, Mich
National Engineering Co., 549 W. Washington Blvd., Chicago, Ill.
*NORTHERN ENGINEERING WORKS, Detroit, Mich...*p. 397*

Fo

Digitized by Google

Osborn Mfg. Co., 5401 Hamilton Ave., Cleveland, Ohio
*PANGBORN CORP'N, P. O. Box 859, Hagerstown, Md...*p. 636, 637*
Pittsburgh Furnace Co., 215 Sycamore St., Milwaukee, Wis.
Ross, George A., 1951 W. Madison St., Chicago, Ill.
Sly, W. W. Mfg. Co., Cleveland, Ohio
STANDARD SAND & MACHINE CO., 5151 St. Clair Ave., Cleveland, Ohio..*p. 635*
Whitehead Bros. Co., 537-539 W. 27th St., New York, N. Y.
Whiting Corp'n, Harvey, Ill.

FOUNDRY FACING
(See Facings, Foundry)

FOUNDRY RIDDLES
Buffalo Wire Works Co., 540 Terrace, Buffalo, N. Y.
Champion Foundry & Machine Co., 2419 W. 14th St., Chicago, Ill.
*HENDRICK MFG. CO., Carbondale, Pa...*p. 653*
Morse & Whyte Co., Sidney & Pilgrim St., Cambridge, Mass.
Tessmer Machine & Tool Co., 1425-45 Rivard St., Detroit, Mich.

FOUNDRY SAND HANDLING EQUIPMENT
BARTLETT & SNOW CO., C. O., Cleveland, Ohio..*p. 367*
STANDARD SAND & MACHINE CO., Cleveland, Ohio..*p. 635*

FOUNDRY SUPPLIES
Obermayer, S. Co., Cincinnati, Ohio
Osborn Mfg. Co., 5401 Hamilton Ave., Cleveland, Ohio
Paxson, J. W. Co., 1021 N. Delaware Ave., Philadelphia, Pa.
Whitehead Bros. Co., 537-539 W. 27th St., New York, N. Y.

FRAMES
—Hack Saw
ATKINS, E. C. & CO. (Inc.), Indianapolis, Ind...*p. 506*
Dissinger & Bro. (Inc.), C. H. A., Wrightsville, Pa.
*STARRETT, L. S. CO., Athol, Mass...*p. 508*
—Worsted Drawing
FRANKLIN MACHINE CO. ("Frotteurs"), P. O. Address, Box 1393, Providence, R. I. *p. 9*

FRICTION CLUTCHES
(See Clutches, Friction)

FRICTIONS
—Cork Insert
Cork Insert Co., 164 Federal St., Boston, Mass.
—Fibre
AMERICAN VULCANIZED FIBRE CO., Wilmington, Del...*p. 417*
*CALDWELL, H. W. & SON CO., 17th St. & Western Ave., Chicago, Ill...*p. 370*
Rockford Mfg. Co., Indianapolis, Ind.
—Paper and Iron
*CALDWELL, H. W. & SON CO., 17th St. & Western Ave., Chicago, Ill...*p. 370*
*MEDART PATENT PULLEY CO., St. Louis, Mo...*p. 333*
Rockwood Mfg. Co., Indianapolis, Ind.

FUEL ECONOMIZERS, GAS PLANTS, ETC.
(See Economizers, Gas Plants, etc., Fuel)

FUEL TESTING APPARATUS
Standard Calorimeter Co., East Moline, Ill.

FURNACES
—Annealing and Tempering
AMERICAN GAS FURNACE CO., Elizabeth, N. J...*p. 527*
AMERICAN INDUSTRIAL FURNACE CORP'N, 10 Post Office Sq., Boston, Mass. *p. 528*
ANTHONY CO., 138 West Ave., Long Island City, N. Y...*p. 530*
Bellevue Industrial Furnace Co., 703 Bellevue Ave., Detroit, Mich.
*BEST, W. N. FURNACE & BURNER CORP'N ("Calorex"), 11 Broadway, New York, N. Y...*pp. 130, 531*
BROWN INSTRUMENT CO. ("Brown"), Phliadelphia, Pa...*p. 292*
Burns Hydro Carbon Burner Co., Fort Plain, N. Y.
Chicago Flexible Shaft Co., 5600 Roosevelt Rd., Chicago, Ill.
Dempsey Furnace Co., 15 Park Row, New York, N. Y.
Hofmann Engineering Co. (Inc.), 557-559 W. Quincy St., Chicago, Ill.
Kenworthy, Charles F. (Inc.), Waterbury, Conn.
Moyer, Albert W., Singer Bldg., New York.
National Gas Furnace Co., 9 Codding St., Providence, R. I.
*ROCKWELL, W. S. CO., 50 Church St., New York, N. Y...*p. 529*
Scott, C. U. & Son, 1510 1st Ave., Rock Island, Ill.
Strong, Carlisle & Hammond Co., Cleveland Ohio
Surface Combustion Co. (Inc.), 366-368 Gerard Ave., Bronx, New York.
—Babbitt
ANTHONY CO., 138 West Ave., Long Island City, N. Y...*p. 530*
—Billet Heating
AMERICAN INDUSTRIAL FURNACE CORP'N, 10 Post Office Sq., Boston, Mass. *p. 528*
ANTHONY CO., 138 West Ave., Long Island City, N. Y...*p. 530*
*BEST, W. N. FURNACE & BURNER CORP'N ("Calorex"), 11 Broadway, New York, N. Y...*pp. 130, 531*
Kenworthy, Charles F. (Inc.), Waterbury, Conn.
*ROCKWELL, W. S. CO., 50 Church St., New York, N. Y...*p. 529*
—Blast
ANTHONY CO., 138 West Ave., Long Island City, N. Y...*p. 530*
Hofman Engineering Co. (Inc.), 557-559 W. Quincy St., Chicago, Ill.
LEBANON BOILER WORKS (J. K. Petty & Co., Inc.), 6 So. 15th St., Philadelphia, Pa...*pp. 78, 79*
McAleenan Brothers Co., 25th & R. R. Sts., Pittsburgh, Pa.
Meihr, John & Sons, 96th St. & Calumet River, Chicago, Ill.
Muskegon Boiler Works, 18-22 Eighth St., Muskegon, Mich.
Pollock, Wm. B. Co., Youngstown, Ohio
Sharpsville Boiler Works, Sharpsville, Pa.
—Boiler
*AMERICAN ENGINEERING CO., Philadelphia, Pa...*p. 111*
American Spiral Pipe Works, Box 485, Chicago, Ill.
AUTOMATIC FURNACE CO. ("Model Automatic"), Dayton, Ohio..*pp. 118, 118*
BERNITZ FURNACE APPLIANCE CO. ("Long Life"), 15 State Street, Boston, Mass...*p. 133*
*BEST, W. N. FURNACE & BURNER CORP'N ("Calorex"), 11 Broadway, New York, N. Y...*pp. 130, 531*
Burke Furnace Co., 223 W. Austin Ave., Chicago, Ill.
*CASEY-HEDGES CO., Chattanooga, Tenn. *pp. 60, 61*

Digitized by Google

Chicago Down Draft Furnace Co., 115-117 So. Clinton St., Chicago, Ill.
Cokal Stoker Co., 1029-A N. Clark St., Chicago, Ill.
Detrick, M. H. Co., 549 W. Washington St., Chicago, Ill.
DETROIT STOKER COMPANY, Detroit, Mich...*pp. 114, 115*
FLYNN & EMRICH CO. ("Huber"), Baltimore, Md...*p. 121*
Hagan, George J. Co., 401 Peoples Bank Bldg., Pittsburgh, Pa.
McKenzie Furnace Co., 647 McCormick Bldg., Chicago, Ill.
Moloch Co., Kaukauna, Wis.
*MURPHY IRON WORKS, Detroit, Mich. *p. 118*
*RILEY, SANFORD STOKER CO. (Ltd.), Worcester, Mass...*p. 119*
Scharf Smoke Preventer Co., Ypsilanti, Mich.
UNDER-FEED STOKER CO. OF AMERICA, Book Bldg., Detroit, Mich...*p. 120*
*WASHBURN & GRANGER (Inc.). ("Dean"), 50 Church St., New York, N. Y...*p. 127*
Wetzel Mechanical Stoker Co. of New York (Inc.), ("Wetzel"), 30 Church St., New York, N. Y.
Woolson O. C. Son, 39 Cortlandt St., New York, N. Y.

—Car-Bottom
ANTHONY CO., 138 West Ave., Long Island City, N Y...*p. 530*
Hofmann Engineering Co., 557-559 W. Quincy St., Chicago, Ill.

—Case Hardening
AMERICAN GAS FURNACE CO., Elizabeth, N. J...*p. 527*
AMERICAN INDUSTRIAL FURNACE CORP'N, 10 Post Office Sq.. Boston, Mass. *p. 528*
ANTHONY CO., 138 West Ave., Long Island City, N. Y...*p. 530*
Bellevue Industrial Furnace Co., 703 Bellevue Ave., Detroit, Mich.
*BEST, W. N. FURNACE & BURNER CORP'N ("Calorex"). 11 Broadway, New York, N. Y...*pp. 130, 531*
Chicago Flexible Shaft Co.. 5600 Roosevelt Road, Chicago, Ill.
*ROCKWELL, W. S. CO., 50 Church St., New York, N. Y...*p. 529*

—Coal Burning
AMERICAN INDUSTRIAL FURNACE CORP'N, 10 Post Office Sq., Boston, Mass. *p. 528*
*ROCKWELL, W. S. CO., 50 Church St., New York, N. Y...*p. 529*

—Down-Draft
*CASEY-HEDGES CO., Chattanooga, Tenn. *pp. 60, 61*
Chicago Down Draft Furnace Co., 115-117 S. Clinton St., Chicago, Ill.
*O'BRIEN, JOHN BOILER WORKS CO., St. Louis, Mo...*p. 83*
Swan, John F., 10th St. & Duncannon Ave., Philadelphia, Pa.

—Dross Reducing
ANTHONY CO., 138 West Ave., Long Island City, N. Y...*p. 530*

—Electric
Ajax Electrothermic Corp'n, 636 E. State St., Trenton, N. J.
AMERICAN INDUSTRIAL FURNACE CORP'N, 10 Post Office Sq., Boston, Mass. *p. 528*
Bario Metal Corp'n, 167 W. 18th St., New York, N. Y.
Booth Electric Furnace Co., 326 W. Madison St., Chicago, Ill.
BROWN INSTRUMENT CO. ("Brown") Philadelphia, Pa...*p. 292*
Crowley, John A. Co., 120 Liberty St., New York, N. Y.
Detroit Electric Furnace Co., 642 Book Bldg., Detroit, Mich.
Electric Furnace Co. ("Baily"), Alliance, Ohio
Electric Furnace Construction Co. ("Greaves-Etchells"), Finance Bldg., Philadelphia, Pa.
Engelhard, Charles, 30 Church St, New York, N. Y.
General Combustion Co., Monadnock Bldg., Chicago, Ill.
*GENERAL ELECTRIC CO., Schenectady, N. Y...*pp. 18, 19, 20, 21*
Greene Electric Furnace Co., 1206 Hoge Bldg., Seattle, Wash.
Hamilton & Hansell (Inc.), Park Row Bldg., New York, N. Y.
Hanovia Chemical & Mfg. Co., Chestnut St. & N. J. R. R. Ave., Newark, N. J.
Hoskins Mfg Co., 4437 Lawton Ave., Detroit, Mich.
Ludlum Electric Furnace Corp'n, Watervliet, N. Y.
NEW YORK CENTRAL IRON WORKS CO (Inc.), North Middleburg Rd., Hagerstown Md...*p. 659*
Pittsburgh Electric Furnace Corp'n, 707 Union Bank Bldg., Pittsburgh, Pa.
Pittsburgh Furnace Co., 215 Sycamore St., Milwaukee, Wis.
Price, T. W. Engineering Co., Woolworth Bldg., New York, N. Y.
Pyrolectric Instrument Co., 636-640 E. State St., Trenton, N. J.
Repel-Arc Furnace Co., 227 E. South St., Indianapolis, Ind.
*ROCKWELL, W. S. CO., 50 Church St., New York, N. Y...*p. 529*

—Electric (Induction)
Greene Electric Furnace Co., 1206 Hoge Bldg., Seattle, Wash.

— Electric (Vacuum)
Ajax Electrothermic Corp'n, ("Ajax-Northrup"), 636 E. State St., Trenton, N. J.

—Enameling
AMERICAN INDUSTRIAL FURNACE CORP'N, 10 Post Office Sq., Boston, Mass. *p. 528*
ANTHONY CO., 138 West Ave., Long Island City, N. Y...*p. 530*
*BEST, W. N. FURNACE & BURNER CORP'N ("Calorex"), 11 Broadway, New York, N. Y...*pp. 130, 531*
Chicago Flexible Shaft Co., 5600 Roosevelt Rd., Chicago, Ill.
National Gas Furnace Co., 9 Codding St., Providence, R. I.
*ROCKWELL, W. S. CO., 50 Church St., New York, N. Y...*p. 529*

—Forging
AMERICAN GAS FURNACE CO., Elizabeth, N. J...*p. 527*
AMERICAN INDUSTRIAL FURNACE CORP'N, 10 Post Office Sq., Boston, Mass. *p. 528*
ANTHONY CO., 138 West Ave., Long Island City, N. Y...*p. 530*
*BEST, W. N. FURNACE & BURNER CORP'N ("Calorex"), 11 Broadway, New York, N. Y...*pp. 130, 531*
Dempsey Furnace Co., 15 Park Row, New York, N. Y.
Ferguson Furnace Co., Sec. Nat'l Bank Bldg., Toledo, Ohio
Hofmann Engineering Co. (Inc.), 557-559 W. Quincy St., Chicago, Ill.
Kenworthy, Charles F. (Inc.), Waterbury, Conn.

Fu

Digitized by Google

FURNACES (Continued)
National Supply Co., 412 Orleans St., Chicago, Ill.
*ROCKWELL, W. S. CO., 50 Church St., New York, N. Y...*p. 529*
SULLIVAN MACHINERY CO., 120 S. Michigan Ave., Chicago, Ill...*p. 549*
Tate-Jones & Co. (Inc.), Pittsburgh, Pa.

—Gas
AMERICAN GAS FURNACE CO., Elizabeth, N. J...*p. 527*
AMERICAN INDUSTRIAL FURNACE CORPORATION, 10 Post Office Sq., Boston, Mass...*p. 528*
ANTHONY COMPANY, 138 West Ave., Long Island City, N. Y...*p. 530*
BROWN INSTRUMENT CO. ("Brown"), Philadelphia, Pa...*p. 292*
Flinn & Dreffein Co., 431 S. Dearborn St., Chicago, Ill.
KOVEN, L. O. & BROTHER, 154 Ogden Ave., Jersey City, N. J...*p. 605*
KROESCHELL BROS., 460 West Erie St., Chicago, Ill...*p. 75*
National Gas Furnace Co., 9 Codding St., Providence, R. I.
*ROCKWELL, W. S. Co., 50 Church St., New York, N. Y...*p. 529*
Schwab, Gustav, 525 Market St., San Francisco, Cal.
SULLIVAN MACHINERY CO., 120 S. Michigan Ave., Chicago, Ill...*p. 549*
Surface Combustion Co., Inc., 366-368 Gerard Ave., Bronx, New York
Syracuse Industrial Gas Co., 206 McCarthy Bldg., Syracuse, N. Y.
Yost Mfg. Co., Meadville, Pa.

—Hardening
AMERICAN GAS FURNACE CO., Elizabeth, N. J. *p. 527*
AMERICAN INDUSTRIAL FURNACE CORP'N. 10 Post Office Sq., Boston, Mass. ..*p. 528*
ANTHONY COMPANY, 138 West Ave., Long Island City, N. Y...*p. 530*
*BEST, W. N. FURNACE & BURNER CORPN. ("Calorex"), 11 Broadway, New York, N. Y...*pp. 130, 531*
BROWN INSTRUMENT CO. ("Brown"), Philadelphia, Pa...*p. 292*
Metals Production Equipment Co., 105 W. 40th St., New York, N. Y.
*ROCKWELL, W. S. CO., 50 Church St., New York, N. Y...*p. 529*
Scott, C. U. & Son, 1510 1st Ave., Rock Island, Ill.
Standard Fuel Engineering Co., 667 Post St., So., Detroit, Mich.

—Heat Treating
Ajax Electrothermic Corpn., 636 E. State St., Trenton, N. J.
AMERICAN GAS FURNACE CO., Elizabeth, N. J...*p. 527*
AMERICAN INDUSTRIAL FURNACE CORPN., 10 Post Office Sq., Boston, Mass. ..*p. 528*
ANTHONY COMPANY, 138 West Ave., Long Island City, N. Y...*pp. 530, 620*
*BEST, W. N. FURNACE & BURNER CORPN. ("Calorex"), 11 Broadway, New York, N. Y...*pp. 130, 531*
BROWN INSTRUMENT CO., ("Brown"), Philadelphia, Pa...*p. 292*
Champion Kerosene Burner Co. ("Champion"), Lima, Ohio
Dempsey Furnace Co., 15 Park Row, New York, N. Y.
Eclipse Fuel Engrg. Co., Rockford, Ill.
Electric Furnace Co. ("Baily"), Alliance, O.
Ferguson Furnace Co., Sec. Natl. Bank Bldg., Toledo, Ohio
General Combustion Co., 347 Monadnock Bldg., Chicago, Ill.
Gilbert & Barker Mfg. Co., Springfield, Mass.
Hofmann Engineering Co. (Inc.), 557-559 W. Quincy St., Chicago, Ill.
Kenworthy, Charles F., Inc., Waterbury, Conn.
Ludlum Electric Furnace Corpn., Watervliet, N. Y.
Mahr Manufacturing Co., 1300 N. E. Quincy St., Minneapolis, Minn.
Moyer, Albert W., Singer Bldg., New York, N. Y.
*ROCKWELL, W. S. CO., 50 Church St., New York, N. Y...*p. 529*
Standard Fuel Engineering Co., 667 Post St., So., Detroit, Mich.
Surface Combustion Co., Inc., 366-368 Gerard Ave., Bronx, New York
Wayne Oil Tank & Pump Co., 749 Canal St., Fort Wayne, Ind.

—Japanning
ANTHONY CO., 138 West Ave., Long Island City, N. Y...*p. 530*

—Laboratory
ANTHONY CO., 138 West Ave., Long Island City, N. Y...*p. 530*
*BEST, W. N. FURNACE & BURNER CORPN. ("Calorex"), 11 Broadway, New York, N. Y...*pp. 130, 531*
BROWN INSTRUMENT CO. ("Brown"), Philadelphia, Pa...*p. 292*
*ROCKWELL, W. S. CO., 50 Church St., New York, N. Y...*p. 529*

—Melting
AMERICAN GAS FURNACE CO., Elizabeth, N. J...*p. 527*
AMERICAN INDUSTRIAL FURNACE CORP'N, 10 Post Office Sq., Boston, Mass. ..*p. 528*
ANTHONY COMPANY, 138 West Ave., Long Island City, N. Y...*p. 530*
*BEST, W. N. FURNACE & BURNER CORPN. ("Calorex"), 11 Broadway, New York, N. Y...*pp. 130, 531*
Chapman-Stein Furnace Co., Mt. Vernon, O.
Detroit Electric Furnace Co., 642 Book Bldg., Detroit, Mich.
Eclipse Fuel Engrg. Co., Rockford, Ill.
Electric Furnace Co. ("Baily"), Alliance, O.
Ferguson Furnace Co., Sec. Natl. Bank Bldg., Toledo, Ohio
Fisher, Alfred Furnace Co., 803 W. Madison St., Chicago, Ill.
Foundry Equipment Co., 1831 Columbus Rd., Cleveland, Ohio
Fuller Engineering Co., Allentown National Bank Bldg., Allentown, Pa.
Greene Electric Furnace Co., 1206 Hoge Bldg., Seattle, Wash.
Granger, A. D. Co. ("Schwartz"), 15 Park Row, New York, N. Y.
Hawley Down-Draft Furnace Co., Easton, Pa.
KOVEN, L. O. & BROTHER, 154 Ogden Ave., Jersey City, N. J...*p. 605*
Monarch Engineering & Mfg. Co., 1206 American Bldg., Baltimore, Md.
Repel-Arc Furnace Co., 227 E. South St., Indianapolis, Ind.
ROCKWELL, W. S. CO., 50 Church St., New York, N. Y...*p. 529*

—Muffle
AMERICAN GAS FURNACE CO., Elizabeth, N. J...*p. 527*
AMERICAN INDUSTRIAL FURNACE CORP'N. 10 Post Office Sq., Boston, Mass. ..*p. 528*
ANTHONY COMPANY, 138 West Ave., Long Island City, N. Y...*p. 530*
*BEST, W. N. FURNACE & BURNER CORPN. ("Calorex"), 11 Broadway, New York, N. Y...*pp. 130, 531*

Digitized by Google

*ROCKWELL, W. S. CO., 50 Church St., New York, N. Y...*p. 529*

—Non-Ferrous

*ALLIS-CHALMERS MFG. CO., Milwaukee, Wis...*pp. 28, 29*
AMERICAN GAS FURNACE CO., Elizabeth, N. J...*p. 527*
AMERICAN INDUSTRIAL FURNACE CORP'N, 10 Post Office Sq., Boston, Mass. ..*p. 528*
ANTHONY CO., 138 West Ave., Long Island City, N. Y...*p. 530*
Detroit Electric Furnace Co., 642 Book Bldg., Detroit, Mich.
Electric Furnace Construction Co. ("Greaves-Etchells"), Finance Bldg., Philadelphia, Pa.
*MAXON FURNACE & ENGRG. CO., Muncie, Ind...*pp. 532, 533*
Pittsburgh Electric Furnace Corpn., 707 Union Bank Bldg., Pittsburgh, Pa.
Repel-Arc Furnace Co., 227 E. South St., Indianapolis, Ind.

—Non-Oxidizing

AMERICAN INDUSTRIAL FURNACE CORP'N, 10 Post Office Sq., Boston, Mass. ..*p. 528*
ANTHONY COMPANY, 138 West Ave., Long Island City, N. Y...*p. 530*
*BEST, W. N. FURNACE & BURNER CORPN. ("Calorex"), 11 Broadway, New York, N. Y...*pp. 130, 531*
*ROCKWELL, W. S. CO., 50 Church St., New York, N. Y...*p. 529*

—Oil

AMERICAN GAS FURNACE CO., Elizabeth, N. J...*p. 527*
AMERICAIN INDUSTRIAL FURNACE CORP'N, 10 Post Office Sq., Boston, Mass. ..*p. 528*
ANTHONY COMPANY, 138 West Ave., Long Island City, N. Y...*p. 530*
Baird Pneumatic Tool Co., Rialto Bldg., Kansas City, Mo.
*BEST, W. N. FURNACE & BURNER CORPN. ("Calorex") 11 Broadway, New York, N. Y...*pp. 130, 531*
Burns Hydro Carbon Burner Co., Fort Plain, N. Y.
General Combustion Co., Monadnock Bldg., Chicago, Ill.
Hammel Oil Burning Equipment Co., 12 Pearl St., Boston, Mass.
*INGERSOLL RAND CO., 11 Broadway, New York, N. Y...*pp. 546, 547*
KROESCHELL BROS. CO., 460 West Erie St., Chicago, Ill...*p. 75*
National Supply Co., 412 Orleans St., Chicago, Ill.
Naudain, John E., Sparrows Point, Md.
*ROCKWELL, W. S. CO., 50 Church St., New York, N. Y...*p. 529*
Standard Fuel Engineering Co., 667 Post St., So., Detroit, Mich.
SULLIVAN MACHINERY CO., 120 S. Michigan Ave., Chicago, Ill...*p. 549*

—Open Hearth

Wellman-Seaver-Morgan Co., Cleveland, O.

—Powdered Coal

*ERIE CITY IRON WORKS, Erie, Pa...*pp. 66, 67*
*FULLER-LEHIGH CO., Fullerton, Pa...*p. 128*
*QUIGLEY FURNACE SPECIALTIES CO. (Inc.), 26 Cortlandt St., New York, N. Y. ..*pp. 129, 138, 139*

—Refining

ANTHONY CO., 139 West Ave., Long Island City, N. Y...*p. 530*
*ROCKWELL, W. S. CO., 50 Church St., New York, N. Y...*p. 529*

—Regenerative

Chapman-Stein Furnace Co. ("Stein"), Mt. Vernon, Ohio

—Reheating

AMERICAN INDUSTRIAL FURNACE CORP'N, 10 Post Office Sq., Boston, Mass. ..*p. 528*
*BEST, W. N. FURNACE & BURNER CORPN. ("Calorex"), 11 Broadway, New York, N. Y...*pp. 130, 531*
*INGERSOLL-RAND CO., 11 Broadway, New York, N. Y...*pp. 546, 547*
*ROCKWELL, W. S. CO., 50 Church St, New York, N. Y...*p. 529*

—Rivet

AMERICAN GAS FURNACE CO., Elizabeth, N. J...*p. 527*
ANTHONY COMPANY, 138 West Ave., Long Island City, N. Y...*p. 530*
BEACH-RUSS CO., 50 Church St., New York, N. Y...*p. 560*
*BEST, W. N. FURNACE & BURNER CORPN. ("Calorex"), 11 Broadway, New York, N. Y...*pp. 130, 531*
Champion Kerosene Burner Co. ("Champion"), Lima, Ohio
Taylor Welder Co., Warren, Ohio

—Scaling

ANTHONY CO., 138 West Ave., Long Island City, N. Y...*p. 530*
*ROCKWELL, W. S. CO., 50 Church St., New York, N. Y...*p. 529*

—Sherardizing

ANTHONY CO., 138 West Ave., Long Island City, N. Y...*p. 530*
United States Sherardizing Co., New Castle, Pa.

—Smokeless

*AMERICAN ENGINEERING CO., Philadelphia, Pa...*p. 111*
AUTOMATIC FURNACE CO. ("Model Automatic"), Dayton, Ohio...*pp. 112, 113*
*BEST, W. N. FURNACE & BURNER CORPN. ("Calorex"), 11 Broadway, New York, N. Y...*pp. 130, 531*
Burke Furnace Co., 223 W. Austin Ave., Chicago, Ill.
*CASEY-HEDGES CO., Chattanooga, Tenn. ..*pp. 60, 61*
Chicago Down Draft Furnace Co., 115-117 S. Clinton St., Chicago, Ill.
Chicago Tile Arch Furnace Co., 2600-10 W. Grand Ave., Chicago, Ill.
Crowe, Paul L., 33 Bidwell Ave., Jersey City, N. J.
DETROIT STOKER COMPANY, Detroit, Mich...*pp. 114, 115*
*FILES ENGINEERING CO. (Inc.), Providence, R. I...*p. 122*
FLYNN & EMRICH CO. ("Huber"), Baltimore, Md...*p. 121*
Harris Incinerators Steam Generator Co., 1212-1213 Independent Life Bldg., Nashville, Tenn.
Herbert Boiler Co., Root & La Salle Sts., Chicago, Ill.
Hofft, M. A. Co., Indianapolis, Ind.
KEWANEE BOILER CO., Kewanee, Ill... ..*pp. 622, 623, 624*
Macledе-Christy Clay Products Co., 1673 Ry. Exchange Bldg., St. Louis, Mo.
McKenzie Furnace Co., 647 McCormick Bldg., Chicago, Ill.
McMillan, James & Co., 114 Clarkson St., Chicago, Ill.
*MURPHY IRON WORKS, Detroit, Mich... *p. 118*
OIL CITY BOILER WORKS ("Oil City"). Oil City, Pa...*p. 84*
*RILEY, SANFORD STOKER CO. (Ltd.), Worcester, Mass...*p. 119*

Fu

Digitized by Google

St. John Grate Bar Co., Machy. Dept., The Bourse, Philadelphia, Pa.
Scharf Smoke Preventer Co., Ypsilanti, Mich.
Swift Stoker Co., Railway Exchange Bldg., Chicago, Ill.
Twin Fire Furnace Co. (''Twin Fire''), 1252 First National Bank Bldg., Chicago, Ill.
UNDER-FEED STOKER CO. OF AMERICA, Book Bldg., Detroit, Mich...*p. 120*

—Soldering Iron (Electric)
*GENERAL ELECTRIC CO., Schenectady, N. Y...*pp. 18, 19, 20, 21*

—Steel
AMERICAN INDUSTRIAL FURNACE CORPN., 10 Post Office Sq., Boston, Mass. ..*p. 528*
ANTHONY CO., 138 West Ave., Long Island City, N. Y...*p. 530*
Electric Furnace Construction Co. (''Greaves-Etchells''), Finance Bldg., Philadelphia, Pa.
Greene Electric Furnace Co., 1206 Hoge Bldg., Seattle, Wash.
Pittsburgh Electric Furnace Corpn., 707 Union Bank Bldg., Pittsburgh, Pa.
Pittsburgh Furnace Co., 215 Sycamore St., Milwaukee, Wis.
Scott, C. U. & Son, 1510 1st Ave., Rock Island, Ill.
U. S. Electric Furnace Co., 704 Union Bank Bldg., Pittsburgh, Pa.

FUSES
*GENERAL ELECTRIC CO., Schenectady, N. Y...*pp. 18, 19, 20, 21*
*JOHNS-MANVILLE (Inc.), (''Noark''), New York, N. Y...*p. 244*
Johns-Pratt Co. (''Noark''), 555 Capitol Ave., Hartford, Conn.

FUSIBLE PLUGS
(See Plugs, Fusible)

Ga

G

GAGE BOARDS
AMERICAN STEAM GAUGE & VALVE MFG. CO., Boston, Mass...*pp. 200, 201*
Ashcroft Mfg. Co., 119 W. 40th St., New York, N. Y.
*ASHTON VALVE CO., 161 First St., Cambridge, Boston, Mass...*p. 287*
Bogardus-Nelson Co., Marshalltown, Iowa
*CROSBY STEAM GAGE & VALVE CO., 40 Central St., Boston, Mass...*pp. 202, 208*
*FOXBORO CO. (Inc.), Foxboro, Mass...*p. 293*
LONERGAN, J. E. CO., 211-215 Race St., Philadelphia, Pa...*pp. 203, 289*
*PRECISION INSTRUMENT CO., Newark, N. J...*pp. 284, 285*
*SCHAEFFER & RUDENBERG MFG. CO., Brooklyn, N. Y...*p. 295*
UNITED STATES GAUGE CO., 44 Beaver St., New York, N. Y...*p. 290*

GAGE GLASS PROTECTORS
Huyette, Paul B. Co. (Inc.), (''PBH''), 5 So. 18th St., Philadelphia, Pa.
Sargent Co., W. Jackson Blvd., Des Plains Ave., Chicago, Ill.

CAGE GLASSES
Advance Packing & Supply Co. (''Firma''), 11 N. Franklin St., Chicago, Ill.
Chesterton, A. W. Co., 64 India St., Boston, Mass.
*CRANE CO., 836 S. Michigan Ave., Chicago, Ill...*pp. 170, 171, 172, 173*
Durabla Mfg. Co., 114 Liberty St., New York, N. Y.
Magee Valve Co. (Inc.), 135 Beekman St., New York, N. Y.
Rogers, H. A. Co. (''Moncrieff's''), 87 Walker St., New York, N. Y.
*SCHAEFFER & BUDENBERG MFG. CO. (''Resisto''), Brooklyn, N. Y...*p. 295*

GAGE TESTERS
AMERICAN STEAM GAUGE & VALVE MFG. CO., Boston, Mass...*pp. 200, 201*
*ASHTON VALVE CO., 161 First St., Cambridge, Boston, Mass...*p. 287*
*CROSBY STEAM GAGE & VALVE CO., 40 Central St., Boston, Mass...*pp. 202, 208*
LONERGAN, J. E. CO., 211-215 Race St., Philadelphia, Pa...*pp. 203, 289*
*SCHAEFFER & BUDENBERG MFG. CO., Brooklyn, N. Y...*pp. 295*
Sterling Products Co. (Inc.), Harvard Sq., Cambridge, Mass.
UNITED STATES GAUGE CO., 44 Beaver St., New York, N. Y...*p. 290*

GAGES
—Absolute Pressure
AMERICAN STEAM GAUGE & VALVE MFG. CO., Boston, Mass...*pp. 200, 201*
BROWN INSTRUMENT CO. (''Brown''), Philadelphia, Pa...*p. 292*
*CROSBY STEAM GAGE & VALVE CO., 40 Central St., Boston, Mass...*pp. 202, 208*
LONERGAN, J. E. CO., 211-215 Race St., Philadelphia, Pa...*pp. 203, 289*
*PRECISION INSTRUMENT CO., Newark, N. J...*pp. 284, 285*
TAGLIABUE, C. J. MFG. CO., 18-88 33rd St., Brooklyn, N. Y...*p. 296*
*UEHLING INSTRUMENT CO., 2011 Empire Bldg., New York, N. Y...*p. 286*

—Altitude
AMERICAN STEAM GAUGE & VALVE MFG. CO., Boston, Mass...*pp. 200, 201*
*ASHTON VALVE CO., 161 First St., Cambridge, Boston, Mass...*p. 287*
*BUILDERS IRON FOUNDRY, Providence, R. I...*p. 277*
*CROSBY STEAM GAGE & VALVE CO., 40 Central St., Boston, Mass...*pp. 202, 208*
*FOXBORO CO. (Inc.), Foxboro, Mass...*p. 293*
LONERGAN, J. E. CO., 211-215 Race St., Philadelphia, Pa...*pp. 203, 289*
National Gauge & Equipment Co., 53 E. 42nd St., New York, N. Y.
PNEUMERCATOR CO., 15 Park Row, New York, N. Y...*p. 297*
*PRECISION INSTRUMENT CO., Newark, N. J...*pp. 284, 285*
*SCHAEFFER & BUDENBERG MFG. CO., Brooklyn, N. Y...*p. 295*
UNITED STATES GAUGE CO., 44 Beaver St., New York, N. Y...*p. 290*

—Ammonia
AMERICAN STEAM GAUGE & VALVE MFG. CO., Boston, Mass...*pp. 200, 201*
*ASHTON VALVE CO., 161 First St., Cambridge, Boston, Mass...*p. 287*
*CROSBY STEAM GAGE & VALVE CO., 40 Central St., Boston, Mass...*pp. 202, 208*
*FOXBORO CO. (Inc.), Foxboro, Mass...*p. 293*
LONERGAN, J. E. CO., 211-215 Race St., Philadelphia, Pa...*pp. 203, 289*
NASON MFG. CO., 71 Fulton St., New York, N. Y...*p. 216*
*PRECISION INSTRUMENT CO., Newark, N. J...*pp. 284, 285*
*SCHAEFFER & BUDENBERG MFG. CO., Brooklyn, N. Y...*p. 295*
UNITED STATES GAUGE CO., 44 Beaver St., New York, N. Y...*p. 290*

—Caliper
Federal Products Corpn., 292 Harris Ave., Providence, R. I.
*STARRETT, L. S. CO., Athol, Mass...*p. 508*

Digitized by Google

WILLIAMS, J. H. & CO., 70 Richards St., Brooklyn, N. Y...*p. 517*

—Cylindrical

Greenfield Tap & Die Corpn., Greenfield, Mass.

—Differential Pressure

*ASHTON VALVE CO., 161 First St., Cambridge, Boston, Mass...*p. 287*
*BACHARACH INDUSTRIAL INSTRUMENT CO., Pittsburgh, Pa...p. 279
*BAILEY METER CO. ("Bailey"), 2009 East 46th St., Cleveland, Ohio..*p. 280*
*CROSBY STEAM GAGE & VALVE CO., 40 Central St., Boston, Mass...*pp. 202, 208*
ELECTROLABS CO., Pittsburgh, Pa...*p. 536*
*FOXBORO CO. (Inc.), Foxboro, Mass... *p. 293*
*PRECISION INSTRUMENT CO., Newark, N. J...*pp. 284, 285*
*SCHAEFFER & BUDENBERG MFG. CO., Brooklyn, N. Y...*p. 295*
TAGLIABUE, C. J. MFG. CO., 18-88 33rd St., Brooklyn, N. Y...*p. 296*
*UEHLING INSTRUMENT CO., 2011 Empire Bldg., New York, N. Y...*p. 286*

—Draft

AMERICAN STEAM GAUGE & VALVE MFG. CO., Boston, Mass...*pp. 200, 201*
*BACHARACH INDUSTRIAL INSTRUMENT CO., Pittsburgh, Pa...*p. 279*
*BAILEY METER CO. ("Bailey"), 2009 East 46th St., Cleveland, Ohio..*p. 280*
*BRISTOL CO., Waterbury, Conn...*p. 291*
BROWN INSTRUMENT CO. ("Brown"), Philadelphia, Pa...*p. 292*
Cory, Chas. E. Son (Inc.), 183 Varick St., New York, N. Y.
*CROSBY STEAM GAGE & VALVE CO., 40 Central St., Boston, Mass...*pp. 202, 208*
Dwight Mfg. Co., 565 W. Washington Blvd., Chicago, Ill.
Ellison, Lewis M., 214 W. Kinzie St., Chicago, Ill.
*FOXBORO CO. (Inc.), Foxboro, Mass... *p. 293*
Frink Pyrometer Co., Lancaster, Ohio
HAYS, JOS. W. CORP'N., Michigan City, Ind...*p. 282*
Meriam Co., 8405 Detroit Ave., Cleveland, O.
Peabody Engineering Corpn., 331 Madison Ave., New York, N. Y.
PNEUMERCATOR CO., 15 Park Row, New York, N. Y...*p. 297*
*PRECISION INSTRUMENT CO., Newark, N. J...*pp. 284, 285*
*SCHAEFFER & BUDENBERG MFG. CO., Brooklyn, N. Y...*p. 295*
*UEHLING INSTRUMENT CO., 2011 Empire Bldg., New York, N. Y...*p. 286*
Vulcan Fuel Economy Co., 829 A. Transportation Bldg., Chicago, Ill.

—Drill, Tap & Wire

CLEVELAND TWIST DRILL CO., Cleveland, Ohio...*p. 502*

—Gun

Holmes Mfg. Co., Shelton, Conn.

—Hydraulic

AMERICAN STEAM GAUGE & VALVE MFG. CO., Boston, Mass...*pp. 200, 201*
*ASHTON VALVE CO., 161 First St., Cambridge, Boston, Mass...*p. 287*
*CROSBY STEAM GAGE & VALVE CO., 40 Central St., Boston, Mass...*pp. 202, 208*
*FOXBORO CO. (Inc.), Foxboro, Mass... *p. 293*
HYDRAULIC PRESS MFG. CO., Mount Gilead, Ohio...*p. 593*
LONERGAN, J. E. CO., 211-215 Race St., Philadelphia, Pa...*pp. 203, 289*
PNEUMERCATOR CO., 15 Park Row, New York, N. Y...*p. 297*
*SCHAEFFER & BUDENBERG MFG. CO., Brooklyn, N. Y...*p. 295*
UNITED STATES GAUGE CO., 44 Beaver St., New York, N. Y...*p. 290*
WATSON-STILLMAN CO., 35 Church St., New York, N. Y...*p. 596*

—Liquid Level

Akron-Selle Co., Akron, Ohio
*FOXBORO CO. (Inc.), Foxboro, Mass... *p. 293*
PNEUMERCATOR CO., 15 Park Row, New York, N. Y...*p. 297*
SIMPLEX VALVE & METER CO., Philadelphia, Pa...*p. 278*

—Loss of Head

*BUILDERS IRON FOUNDRY, Providence, R. I...*p. 277*
SIMPLEX VALVE & METER CO., Philadelphia, Pa...*p. 278*

—Master (Bourdon Tube)

UNITED STATES GAUGE CO., 44 Beaver St., New York, N. Y...*p. 290*

—Measuring (Surface, Depth, Dial, Etc.)

Ames, B. C. Co., Waltham, Mass.
City Engineering Co., 35 S. St. Clair St., Dayton, Ohio
City Machine & Tool Works, 3rd & June Sts., Dayton, Ohio
Coats Machine Tool Co., Inc. ("Prestwich"), 30 Church St., New York, N. Y.
Dodge Tool Co., Grinnell, Iowa
Federal Products Corpn., 292 Harris Ave., Providence, R. I.
Johansson, C. E. (Inc.), Poughkeepsie, N. Y.
Marvin, W. B. Mfg. Co., Urbama, Ohio
PRATT & WHITNEY CO. ("Hoke"), 111 New York, N. Y...*p. 471*
*PRECISION INSTRUMENT CO., Newark, N. J...*pp. 284, 285*
Robbins, Gamwell & Co., 68 West St., Pittsfield, Mass.
Rogers, John M. Works, Inc., Gloucester City, N. J.
*STARRETT, L. S. CO., Athol, Mass...*p. 508*
West & Dodge, 22 Parkman St., Boston, Mass.

—Oxy-Acetylene

AMERICAN STEAM GAUGE & VALVE MFG. CO., Boston, Mass...*pp. 200, 201*
*ASHTON VALVE CO., 161 First St., Cambridge, Boston, Mass...*p. 287*
ELECTROLABS CO., Pittsburgh, Pa...*p. 536*
National Gauge & Equipment Co., 53 E. 42nd St., New York, N. Y.
*SCHAEFFER & BUDENBERG MFG. CO., Brooklyn, N. Y...*p. 295*
UNITED STATES GAUGE CO., 44 Beaver St., New York, N. Y...*p. 290*

—Plug, Ring and Snap

BROWN & SHARPE MFG. CO., Providence, R. I...*p. 477*
Fortney Mfg. Co. ("Min"), 7 Bond St., Newark, N. J.
M. S. G. L. CO. (Inc.), Syracuse, N. Y.
Marvin, W. B. Mfg. Co., Urbama, Ohio
PRATT & WHITNEY CO., 111 Broadway, New York, N. Y...*p. 471*
Taft-Pierce Mfg. Co., Woonsocket, R. I.
VELCO MFG. CO. (Inc.), Greenfield, Mass. ..*p. 461*

—Pressure

AMERICAN STEAM GAUGE & VALVE MFG. CO., Boston, Mass...*pp. 200, 201*
Ashcroft Mfg. Co., 119 W. 40th St., New York, N. Y.
*ASHTON VALVE CO., 161 First St., Cambridge, Boston, Mass...*p. 287*

Ga

Digitized by Google

GAGES (Continued)
*BACHARACH INDUSTRIAL INSTRUMENT CO. ("Hydro"), Pittsburgh, Pa. . . *p. 279*
Bogardus-Nelson Co., Marshalltown, Iowa
*BRISTOL CO., Waterbury, Conn. . . *p. 291*
BROWN INSTRUMENT CO. ("Brown"), Philadelphia, Pa. . . *p. 292*
Connelly Iron Sponge & Governor Co. ("Siphon"), 227 Fulton St., New York, N. Y.
*CROSBY STEAM GAGE & VALVE CO., 40 Central St., Boston, Mass. . . *pp. 202, 208*
*FOXBORO CO. (Inc.), Foxboro, Mass. . . *p. 293*
Franklin Die Tool Co., Beck & Park Sts., Columbus, Ohio
Jones Gauge Co., 5½ Broad St., Boston, Mass.
LONERGAN, J. E. CO., 211-215 Race St., Philadelphia, Pa. . . *pp. 203, 289*
Marsh, James P. & Co., 118 S. Clinton St., Chicago, Ill.
National Gauge Co., 300 Pacific St., Brooklyn, N. Y.
National Gauge & Equipment Co., 53 E. 42nd St., New York, N. Y.
National Steam Specialty Co., 12 S. Clinton St., Chicago. Ill.
PIERCE, BUTLER & PIERCE MFG. CORPN., 437 East 162nd Street, New York, N. Y. . . *p. 204*
PNEUMERCATOR CO., 15 Park Row, New York, N. Y. . . *p. 297*
*PRECISION INSTRUMENT CO., Newark, N. J. . . *pp. 284, 285*
*SCHAEFFER & BUDENBERG MFG. CO., Brooklyn, N. Y. . . *p. 295*
Star Brass Mfg. Co., 53 Oliver St., Boston, Mass.
TAGLIABUE, C. J. MFG. CO., 18-88 33rd St., Brooklyn, N. Y. . . *p. 296*
*UEHLING INSTRUMENT CO., 2011 Empire Bldg., New York, N. Y. . . *p. 286*
UNITED STATES GAUGE CO., 44 Beaver St., New York, N. Y. . . *p. 290*
WESTINGHOUSE TRACTION BRAKE CO., Wilmerding, Pa. . . *pp. 550, 551*

—Rate of Flow
*BACHARACH INDUSTRIAL INSTRUMENT CO., Pittsburgh, Pa. . . *p. 279*
BROWN INSTRUMENT CO. ("Brown"), Philadelphia, Pa. . . *p. 292*
*BUILDERS IRON FOUNDRY, Providence, R. I. . . *p. 277*
*FOXBORO CO. (Inc.), Foxboro, Mass. . . *p. 293*
Hydrex Engineering Corpn., 73 West Eagle St., Buffalo, N. Y.
*PRECISION INSTRUMENT CO., Newark, N. J. . . *pp. 284, 285*
Sargent Steam Meter Co., 820-822 S. Tripp Ave., Chicago, Ill.
SIMPLEX VALVE & METER CO. ("Simplex"), Philadelphia, Pa. . . *p. 278*
Sloan, A. H. Co. (Inc.), ("Royer"), 410 Moffat Bldg., Detroit, Mich.

—Rubber Measuring
HOGGSON & PETTIS MFG. CO., New Haven, Conn. . . *pp. 512, 513, 514*

—Screw Thread
Bicknell-Thomas Co., Greenfield, Mass.
BROWN & SHARPE MFG. CO., Providence, R. I. . . *p. 477*
Fortney Mfg. Co. ("Wires"), 7 Bond St., Newark, N. J.
Goddard Tool Co., 351 W. Chicago Ave., Chicago, Ill.
Greenfield Tap & Die Corpn., Greenfield, Mass.
Johansson, C. E. (Inc.), Poughkeepsie, N. Y.
*JONES & LAMSON MACHINE CO. ("Comparator"), Springfield, Vt. . . *pp. 450, 451, 452, 453, 454*
*STARRETT, L. S. CO., Anthol, Mass. . . *p. 508*
West & Dodge, 22 Parkman St., Boston, Mass.

—Ship Draft
PNEUMATIC CO., 15 Park Row, New York, N. Y. . . *p. 297*

—Vacuum
AMERICAN STEAM GAUGE & VALVE MFG. CO., Boston, Mass. . . *pp. 200, 201*
*ASHTON VALVE CO., 161 First St., Cambridge, Boston, Mass. . . *p. 287*
*BACHARACH INDUSTRIAL INSTRUMENT CO., Pittsburgh, Pa. . . *p. 279*
Blonck, W. A. & Co., 155 N. Clark St., Chicago, Ill.
Bogardus-Nelson Co., Marshalltown, Iowa
*BRISTOL CO., Waterbury, Conn. . . *p. 291*
BROWN INSTRUMENT CO. ("Brown"), Philadelphia, Pa. . . *p. 292*
*CROSBY STEAM GAGE & VALVE CO., 40 Central St., Boston, Mass. . . *pp. 202, 208*
*FOXBORO CO. (Inc.), Foxboro, Mass. . . *p. 293*
Jones Gauge Co., 5½ Broad St., Boston, Mass.
LONERGAN, J E. CO., 211-215 Race Sts., Philadelphia, Pa. . . *pp. 203, 289*
National Gauge Co., 300 Pacific St., Brooklyn, N. Y.
National Gauge & Equipment Co., 53 E. 42nd St., New York, N. Y.
National Steam Specialty Co., 12-14 S. Clinton St., Chicago, Ill.
PNEUMERCATOR CO., 15 Park Row, New York, N. Y. . . *p. 297*
*PRECISION INSTRUMENT CO., Newark, N. J. . . *pp. 284, 285*
*SCHAEFFER & BUDENBERG MFG. CO., Brooklyn, N. Y. . . *p. 295*
TAGLIABUE, C. J. MFG. CO., 18-88 33rd St., Brooklyn, N. Y. . . *p. 296*
*UEHLING INSTRUMENT CO., 2011 Empire Bldg., New York, N. Y. . . *p. 286*
UNITED STATES GAUGE CO., 44 Beaver St., New York, N. Y. . . *p. 290*

—Volume
*BACHARACH INDUSTRIAL INSTRUMENT CO. Pittsburgh, Pa. . . *p. 279*
*FOXBORO CO. (Inc.), Foxboro, Mass. . . *p. 293*
BROWN INSTRUMENT CO. ("Brown"), Philadelphia, Pa. . . *p. 292*
PNEUMERCATOR CO., 15 Park Row, New York, N. Y. . . *p. 297*
*PRECISION INSTRUMENT CO., Newark, N. J. . . *pp. 284, 285*

—Water
AMERICAN INJECTOR CO., Detroit, Mich. . . *p. 217*
AMERICAN STEAM GAUGE & VALVE MFG. CO., Boston, Mass. . . *pp. 200, 201*
*BRISTOL CO., Waterbury, Conn. . . *p. 291*
BROWN INSTRUMENT CO. ("Brown"), Philadelphia, Pa. . . *p. 292*
BUCKEYE IRON & BRASS WORKS, Dayton, Ohio. . . *p. 168*
Davis Instrument Mfg Co. (Inc.), 110 W. Fayette St., Baltimore, Md.
Edna Brass Mfg. Co., 525-33 Reading Rd., Cincinnati, Ohio
*FOXBORO CO. (Inc.), Foxboro, Mass. . . *p. 293*
Huyette, Paul B. Co. (Inc.), ("PBH"), 5 S. 18th St., Philadelphia, Pa.
*JENKINS BROS., 80 White St., New York, N. Y. . . *pp. 180, 181*
LONERGAN, J. E. CO., 211-215 Race St., Philadelphia, Pa. . . *pp. 203, 289*
*LUNKENHEIMER CO., Cincinnati, Ohio. . . *pp. 184, 185, 186, 187, 188, 189*

Digitized by Google

McRae & Roberts Co., 211 Campbell Ave., Detroit, Mich.
Northern Tool Co. (Inc.), ("Northern Safety"), 806 Union St., Utica, N. Y.
Ohio Brass Co., Mansfield, Ohio
Penberthy Injector Co., 1242 Holden Ave., Detroit, Mich.
*PRECISION INSTRUMENT CO., Newark, N. J...*pp. 284, 285*
Reliance Gauge Column Co. ("Reliance"), 5902 Carnegie Ave., Cleveland, Ohio
Rich Mfg. Co., 370 Atlantic Ave., Boston, Mass.
Sargent Co., W. Jackson Blvd., Des Plaines Ave., Chicago, Ill.
SIMPLEX VALVE & METER CO., Philadelphia, Pa...*p. 278*
Steigert, L. Co., N. E. Cor. Elder & Sogan Sts., Cincinnati, Ohio
Watertown Specialty Co., 112 E. Moulton St., Watertown, N. Y.
Williams Gauge Co., 543 Fourth Ave., Pittsburgh, Pa.

—Water Level
*BRISTOL CO., Waterbury, Conn...*p. 291*
Hydro Mfg. Co., 320 Bullitt Bldg., Philadelphia, Pa.
PNEUMERCATOR CO., 15 Park Row, New York, N. Y...*p. 297*
*PRECISION INSTRUMENT CO., Newark, N. J...*pp. 284, 285*
*SCHAEFFER & BUDENBERG MFG. CO., Brooklyn, N. Y...*p. 295*
SIMPLEX VALVE & METER CO., Philadelphia, Pa...*p. 278*

GAGING MACHINES
Davie Tool Co., 1662 E. 118th St., Cleveland, Ohio

GALVANIZING
KOVEN, L. O. & BROTHER, 154 Ogden Ave., Jersey City, N. J...*p. 605*
MALLEABLE IRON FITTINGS CO., Branford, Conn...*p. 236*
NEWHALL CHAIN FORGE & IRON CO., 90 West St., New York, N. Y...*p. 410*

—Hot Process
Ruemmeli-Dawley Mfg. Co., 3900 Chouteau Ave., St. Louis, Mo.

GALVANIZING EQUIPMENT
Aetna Foundry & Machine Co., Warren, Ohio
GEUDER, PAESCHKE & FREY CO., Western Valley, Milwaukee, Wis...*p. 434*
Meaker Galvanizing Co., 1243-1249 Fulton St., Chicago, Ill.

GALVANOMETERS
BROWN INSTRUMENT CO. ("Brown"), Philadelphia, Pa...*p. 292*
Thompson-Levering Co., 325 Arch St., Philadelphia, Pa.
*WESTINGHOUSE ELECTRIC & MFG. CO., East Pittsburgh, Pa...*pp. 160, 161*

GARBAGE BURNERS
(See Destructors, Refuse)

GAS (*See*)
Acetylene
Carbonic Acid
Hydrogen
Nitrogen
Oxygen

GAS ANALYSIS APPARATUS
Defender Automatic Regulator Co., 709 Pine St., St. Louis, Mo.
Dwight Mfg. Co., 565 W. Washington Blvd., Chicago, Ill.
ELECTROLABS CO., Pittsburgh, Pa...*p. 536*
*FOXBORO CO. (Inc.), Foxboro, Mass...*p. 293*
GRIEBEL INSTRUMENT CO., Carbondale, Pa...*p. 300*
HAYS, JOS. W. CORPN., Michigan City, Ind...*p. 282*
MONO CORPN. OF AMERICA ("Mono"), 25 W. Broadway, New York, N. Y...*p. 283*
Pierce, Wm. B. Co., 45 North Division St., Buffalo, N. Y.
*PRECISION INSTRUMENT CO., Newark, N. J...*pp. 284, 285*
Vulcan Fuel Economy Co., 829 A. Transportation Bldg., Chicago, Ill.

GAS APPARATUS, FUEL
Kemp, C. M. Mfg. Co., 405 E. Oliver St., Baltimore, Md.

GAS BURNERS, COMPRESSORS, ENGINES, EXHAUSTERS, PRODUCERS, ETC.
(See Burners, Compressors, Engines, Exhausters, Producers, Etc., Gas)

GAS BURNING EQUIPMENT
ANTHONY CO., 138 West Ave., Long Island City, N. Y...*p. 530*
Kemp, C. M. Mfg. Co., 405 E. Oliver St., Baltimore, Md
OVEN EQUIPMENT & MFG. CO., New Haven, Conn...*p. 534*
*ROCKWELL, W. S. CO., 50 Church St., New York, N. Y...*p. 529*
Selas Co., 1126 Widner Bldg., Philadelphia, Pa.

GAS CLEANING PLANTS
Coal & Coke By-Products Co., 421 Wood St., Pittsburgh, Pa.
Flinn & Dreffein Co., 431 S. Dearborn St., Chicago, Ill.
SMITH GAS ENGINEERING CO., Dayton, Ohio..*p. 94*
Western Gas Construction Co., Fort Wayne, Ind.

GAS COLLECTORS
HAYS, JOS. W. CORPN., Michigan City, Ind...*p. 282*
*PRECISION INSTRUMENT CO., Newark, N. J...*pp. 284, 285*
Vulcan Fuel Economy Co., 829 A. Transportation Bldg., Chicago, Ill.

GAS HOLDERS
Bartlett Hayward Co., Baltimore, Md.
*COLE, R. D. MFG. CO., Newnan, Ga...*p 63*
Davis & Farnum Mfg. Co., Foundry Ave., Waltham, Mass.
ELECTROLABS CO., Pittsburgh, Pa...*p. 536*
Improved Equipment Co., 24 State St., New York, N. Y.
KOVEN, L. O. & BROTHER, 154 Ogden Ave., Jersey City, N. J...*p. 605*
LEBANON BOILER WORKS (J. K. Petty & Co., Inc.), 6 So. 15th St., Philadelphia, Pa..*pp. 78, 79*
NEW YORK CENTRAL IRON WORKS CO. (Inc.), North Middleburg Road, Hagerstown, Md...*p. 659*
Riter-Conley Co., Oliver Bldg., Pittsburgh, Pa.
*SCAIFE, WM. B. & SONS CO., Oakmont, Pa...*pp. 143, 660*
Stacey Mfg. Co., Elmwood Place, Cincinnati, Ohio
Western Gas Construction Co., Fort Wayne, Ind.
WOOD, R. D. & CO., Philadelphia, Pa...*p. 597*

GAS HOUSE HANDLING EQUIPMENT
Cooper, C. & G. Co., Mt. Vernon, Ohio

GAS PLANT MACHINERY
Bartlett Hayward Co., Baltimore, Md.
BIGGS BOILER WORKS CO., Case Ave. & Newton St., Akron, Ohio...*p. 650*
Coal & Coke By-Products Co., 421 Wood St., Pittsburgh, Pa.

Ga

Digitized by Google

GAS PLANT MACHINERY (Continued)
*COLE, R. D. MFG. CO., Newnan, Ga...*p. 63*
Cooper, C. & G. Co., Mt. Vernon, Ohio
Davis & Farnum Mfg. Co., Waltham, Mass.
ELECTROLABS CO., Pittsburgh, Pa...*p. 536*
LEBANON BOILER WORKS (J. K. Petty & Co., Inc.), 6 So. 15th St., Philadelphia, Pa. ..*pp. 78, 79*
Stacey Mfg. Co., Elmwood Place, Cincinnati, Ohio
Steere Engineering Co., Woodward & Horton Ave., Detroit, Mich.
Western Gas Construction Co., Fort Wayne, Ind.

—Producer
*COLE, R. D. MFG. CO., Newnan, Ga... *p. 63*
JEFFREY MFG. CO., 904 N. 4th St., Columbus, Ohio..*pp. 376, 377*
Western Gas Construction Co., Fort Wayne, Ind.
WOOD, R. D. & CO., Philadelphia, Pa...*p. 597*

GAS PLANTS
—Blue
Improved Equipment Co., 24 State St., New York, N. Y.
United Gas Improvement Co., Broad & Arch Sts., Philadelphia, Pa.
WOOD, R. D. & CO., Philadelphia, Pa...*p. 597*

—Coal
Gas Machinery Co., 1900 Euclid Ave., Cleveland, Ohio
Improved Equipment Co., 24 State St., New York, N. Y.
Isbell Porter Co., 46 Bridge St., Newark, N. J.
Riter-Conley Co., Oliver Bldg., Pittsburgh, Pa.
Steere Engineering Co., Woodward & Horton Ave., Detroit, Mich.
United Gas Improvement Co., Broad & Arch Sts., Philadelphia, Pa.
WOOD, R. D. & CO., Philadelphia, Pa...*p. 597*

—Gasoline
Tirrill Gas Machine Lighting Co. (''Tirrill''), 50 Church St., New York, N. Y.
Welded Steel Barrel Corpn., Leib & Wight Sts., Detroit, Mich.

—Hydrogen
Improved Equipment Co., 24 State St., New York, N. Y.

—Oxygen and Hydrogen
Burdett Mfg. Co., 309 St. Johns Court, Chicago, Ill.
ELECTROLABS CO., Pittsburgh, Pa...*p. 536*
International Oxygen Co., 796 Frelinghuysen Ave., Newark, N. J.

—Producer
Akerlund & Semmes, 17 Battery Place, New York, N. Y.
Amsler-Morton Co., Blawnox, Pa.
Flinn & Dreffein Co., 431 S. Dearborn St., Chicago, Ill.
Gas Producer and Engineering Corpn., 115 Broad St., New York, N. Y.
General Reduction Gas & By-Products Co., 49 Wall St., New York, N. Y.
MILWAUKEE RELIANCE BOILER WORKS (''Sharp-Bassett''), Milwaukee, Wis...*p. 148*
SMITH GAS ENGINEERING CO., Dayton, Ohio...*p. 94*
Steere Engineering Co., Woodward & Horton Ave., Detroit, Mich.
Wellman-Seaver-Morgan Co., Cleveland, Ohio
WOOD, R. D. & CO., Philadelphia, Pa...*p. 597*

—Water
ANTHONY CO., 138 West Ave., Long Island City, N. Y...*pp. 530, 620*
Gas Machinery Co., 1900 Euclid Ave., Cleveland, Ohio
LEBANON BOILER WORKS (J. K. Petty & Co., Inc.), 6 So. 15th St., Philadelphia, Pa...*pp. 78, 79*

GAS SCRUBBERS
NEW YORK CENTRAL IRON WORKS CO. (Inc.), North Middleburg Road, Hagerstown, Md...*p. 659*
Western Gas Construction Co., Fort Wayne, Ind.

GAS WASHERS
Improved Equipment Co., 24 State St., New York, N. Y.
SMITH, GAS ENGINEERING CO., Dayton, Ohio...*p. 94*
Western Gas Construction Co., Fort Wayne, Ind.
WOOD, R. D. & CO., Philadelphia, Pa...*p. 597*

GAS WELL SUPPLIES
NATIONAL SUPPLY CO., Toledo, Ohio...*pp. 648, 649*

GASKETS
—Ammonia
*CRANE CO., 836 S. Michigan Ave., Chicago, Ill...*pp. 170, 171, 172, 173*
*GREENE, TWEED & CO. (''Greenet''), 109 Duane St., New York, N. Y...*p. 250*
Guillott Metal Gasket & Supply Co. (''Guillott''), 24 S. Clinton St., Chicago, Ill.
*VILTER MFG. CO., 1194-1196 Clinton St., Milwaukee, Wis...*pp. 16, 17*

—Asbestos
Brandt, Randolph, 66 Cortlandt St., New York, N. Y.
Cincinnati Gasket & Packing Co., 1546-48 Elm St., Cincinnati, Ohio
*CRANE CO., 836 S. Michigan Ave., Chicago, Ill...*pp. 170, 171, 172, 173*
Dominion Asbestos & Rubber Corpn., 154 Nassau St., New York, N. Y.
Janos Asbestos Co., 26 Cortlandt St., New York, N. Y.
Standard Mfg. & Supply Co., 30 N. 4th St., Philadelphia, Pa.

—Boiler
Dominion Asbestos & Rubber Corpn., 154 Nassau St., New York, N. Y.
Flexitallic Gasket Co., Camden, N. J.
Guillott Metal Gasket & Supply Co. (''Guillott''), 24 S. Clinton St., Chicago, Ill.

—Copper-Asbestos
Akron Metallic Gasket Co., 152 N. Union St., Akron, Ohio
*GOETZE GASKET & PACKING CO. (''Goetze''), 11 Allen Ave., New Brunswick, N. J...*p. 256*
Metallo Gasket Co., 16-20 Bethany St., New Brunswick, N. J.
Victor Mfg. & Gasket Co., 5750 W. Roosevelt Rd., Chicago, Ill.

—Copper Corrugated
Akron Metallic Gasket Co., 152 N. Union St., Akron, Ohio
Cincinnati Gasket & Packing Co., 1546-48 Elm St., Cincinnati, Ohio
Everitt Co., 261 Franklin St., Boston, Mass.
Gaskets Supply Co. (''Right''), 1718 Ludlow St., Philadelphia, Pa.
*GOETZE GASKET & PACKING CO. (''Goetze''), 11 Allen Ave., New Brunswick, N. J...*p. 256*
Guillott Metal Gasket & Supply Co. (''Guillott''), 24 S. Clinton St., Chicago, Ill.
KELLY & JONES CO., Greensburg, Pa...*pp. 182, 183*
McCord Mfg. Co. (Inc.), Detroit, Mich.

Digitized by Google

Standard Mfg. & Supply Co., 30 N. 4th St., Philadelphia, Pa.
United States Mineral Wool Co., 280 Madison Ave., New York, N. Y.

—Fibre
AMERICAN VULCANIZED FIBRE CO., Wilmington, Del...*p. 417*
*CONTINENTAL FIBRE CO.. Newark, Del. *p. 413*
DIAMOND STATE FIBRE CO., Bridgeport, Pa...*p. 420*
Fibre Finishing Co. (''Vellumoid''), 73 Tremont St., Boston, Mass.

—Iron, Corrugated
Smooth-On Mfg. Co., 570-574 Communipaw Ave., Jersey City, N. J.

—Lead
Guillott Metal Gasket & Supply Co. (''Guillott''), 24 S. Clinton St., Chicago, Ill.
United Lead Co., 111 Broadway, New York, N. Y.

—Metal and Combination
Akron Metallic Gasket Co., 152 N. Union St., Akron, Ohio
*CRANE CO., 836 S. Michigan Ave., Chicago, Ill...*pp. 170, 171, 172, 173*
Gasket Supply Co. (''Right''), 1718 Ludlow St., Philadelphia, Pa.
*GOETZE GASKET & PACKING CO., 11 Allen Ave., New Brunswick, N. J...*p. 256*
Guillott Metal Gasket & Supply Co. (''Guillott''), 24 S. Clinton St., Chicago, Ill.
McCord Mfg. Co. (Inc.), Detroit, Mich.
Metallo Gasket Co., 16-20 Bethany St., New Brunswick, N. J.
Niagara Falls (Ont) Gasket & Packing Co., 50 Church St.. New York. N. Y.
*SARCO CO. (Inc.), 9 Barclay St., New York, N. Y...*pp. 224, 225*
U. S. Indestructible Gasket Co., 50 Church St., New York, N. Y.

—Rubber
Anchor Packing Co., 7th & Filbert Sts., Philadelphia, Pa.
Cincinnati Gasket & Packing Co., 1546-48 Elm St., Cincinnati, Ohio
Edison Packing & Sales Co., 234 State St., Boston, Mass.
GOODRICH, B. F. RUBBER CO., Akron, Ohio..*pp. 258, 259*
*JENKINS BROS., 80 White St., New York, N. Y...*pp. 180, 181*
KELLY & JONES CO., Greensburg, Pa...*pp. 182, 183*
Walsh Packing Co., 304 New St., Philadelphia, Pa.

GASOLINE
Penn Oil & Supply Co., Oil City, Pa.
Sloan & Zook, 101 Main St., Bradford, Pa.
Standard Oil Co., 910 S. Michigan Ave., Chicago, Ill.
Texas Company (The) (''Texaco''), 17 Battery Place, New York, N Y.
TIDE WATER OIL CO. (''Tydol''), 11 Broadway, New York, N. Y...*pp. 252, 253*
Tirrill Gas Machine Lighting Co., 50 Church St., New York, N. Y.

GASOLINE PLANTS
HOPE ENGINEERING & SUPPLY CO., Mt. Vernon, Ohio..*p. 49*

GASOLINE STORAGE OUTFITS
BIGGS BOILER WORKS CO., Case Ave. & Newton St., Akron, Ohio..*p. 650*
KOVEN, L. O. & BROTHER, 154 Ogden Ave., Jersey City, N. J...*p. 605*
MILWAUKEE RELIANCE BOILER WORKS (''Reliance''). Milwaukee, Wis...*p. 148*
*SCAIFE, WM. B. SONS CO., Oakmont, Pa. *pp. 148, 660*

GATE HOISTS
(See Hoists, Head Gate)

GATES
—Blast
*PITTSBURGH VALVE FOUNDRY & CONSTRUCTION CO., P. O. Box 1016, Pittsburgh, Pa...*pp. 192, 193*
*ROCKWELL, W. S. CO., 50 Church St., New York, N. Y...*p. 529*
STURTEVANT, B. F. CO., Hyde Park, Boston, Mass...*p. 106*

—Cut-Off
BARTLETT, C. O. & SNOW CO., Cleveland, Ohio..*p. 367*
HUNT, C. W. CO. (Inc.), West New Brighton, Staten Island, N. Y...*pp. 374, 375*
JEFFREY MFG. CO., 904 N. 4th St., Columbus, Ohio..*pp. 376, 377*
*WASHBURN & GRANGER (Inc.), 50 Church St., New York, N. Y...*p. 127*
WELLER MFG. CO., 1820-1856 N. Kostner Ave., Chicago, Ill...*p. 381*

—Head
Davis Foundry & Machine Works, Rome, Ga.
*JOLLY, J. & W. (Inc.), Holyoke, Mass...*p. 32*

—Sluice
Chapman Valve Mfg. Co., Indian Orchard, Mass.
Coffin Valve Co., Neponset, Mass.
Coldwell-Wilcox Co., Newburgh, N. Y.
Ludlow Valve Mfg. Co., Troy, N. Y.
*PITTSBURGH VALVE FOUNDRY & CONSTRUCTION CO., P. O. Box 1016, Pittsburgh, Pa...*pp. 192, 193*
Rensselaer Valve Co., Troy, N. Y.
*U. S. CAST IRON PIPE & FOUNDRY CO., Burlington, N. J...*pp. 232, 233*

GEAR BLANKS
*AMERICAN FORGE & MACHINE CO., Canton, Ohio...*pp. 430, 431*
AMERICAN MANGANESE BRONZE CO., Holmesburg, Philadelphia, Pa...*p. 415*
AUTOMATIC PRODUCTS CORPN., 199-203 Eighth St., Long Island City, N. Y...*p. 518*
*BROWN, A. & F. CO., 79 Barclay St., New York, N. Y...*p. 303*
Cann & Saul Steel Co., 516 Commerce St., Philadelphia, Pa.
VULCAN STEAM FORGING CO., 247 Rano St., Buffalo, N. Y...*p. 433*

GEAR CUTTING MACHINES
Bilton Machine Tool Co., 555 No. Washington Ave., Bridgeport, Conn.
BROWN & SHARPE MFG. CO., Providence, R. I...*p. 477*
Cincinnati Gear Cutting Machine Co., Elam St. & Garrard Ave., Cincinnati, Ohio
*FELLOWS GEAR SHAPER CO., Springfield, Vt...*pp. 472, 473*
Flather Mfg. Co., Nashua, N. H.
Gleason Works, 1000 University Ave., Rochester, N. Y.
Gould & Eberhardt, Chancellor Ave., Irvington, N. J.
HERCULES MACHINE & TOOL CO. (Inc.), Broome & Lafayette Sts., New York, N. Y. ..*p. 476*
Lees-Bradner Co., 6210 Carnegie Ave., Cleveland, Ohio
Machine Products Co., East 179th St. & St. Clair Ave., Cleveland, Ohio
Newark Gear Cutting Machine Co., 65-75 Prospect St., Newark, N. J.
Riverside Machine Co., Front & Penn Sts., Chester, Pa.
Waltham Machine Works, Waltham, Mass.
Whiton, D. E. Machine Co., New London, Conn.

Ge

See Catalogue Section for data of firms listed in capital type

Digitized by Google

GEAR GENERATORS
Bilgram Machine Works, 1235 Spring Garden St., Philadelphia, Pa.
*FELLOWS GEAR SHAPER CO., Springfield, Vt...*pp. 472, 473*
Gleason Works, 1000 University Ave., Rochester, N. Y.

GEAR HOBBING MACHINES
Adams Co., Dubuque, Ia.
Bilton Machine Tool Co., 555 No. Washington Ave., Bridgeport, Conn.
Cincinnati Gear Cutting Machine Co., Cincinnati, Ohio
Gould & Eberhardt, Chancellor Ave., Irvington, N. J.
Gray Machine Tool Co. (Inc.), 2651 Main St., Buffalo, N. Y.
HERCULES MACHINE & TOOL CO. (Inc.), Broome & Lafayette Sts, New York, N. Y. ..*p. 476*
Lees-Bradner Co., 6210 Carnegie Ave., Cleveland, Ohio
Meisselbach-Catucci Mfg. Co. (''M. C''), 57 Stanton St., Newark, N. J.
Newark Gear Cutting Machine Co., 69 Prospect St., Newark, N. J.

GEAR MOLDING MACHINES
FULTON IRON WORKS CO., St. Louis, Mo. ..*p. 37*

GEAR SHAPERS
*FELLOWS GEAR SHAPER CO., Springfield, Vt...*pp. 472, 473*

GEAR TOOTH ROUNDING MACHINES
Ingle Machine Co., Rochester, N. Y.

GEARS
—Automobile
Cincinnati Gear Co., 1825 Reading Road, Cincinnati, Ohio
Crofoot Gear Works (Inc.), 1601 Hyde Park Ave., Readville, Mass.
Detroit Gear & Machine Co., 670 Woodbridge St., Detroit, Mich.
Frost Gear & Forge Co., Jackson, Mich.
Ganschow, Wm. Co., Washington-Morgan St. Chicago, Ill.
HERCULES MACHINE & TOOL CO. (Inc.), Broome & Lafayette Sts., New York, N. Y. ..*p. 476*
*JAMES, D. O. Mfg. Co., 1114-24 W. Monroe St., Chicago, Ill...*pp. 310, 311*
Lavine Gear Co., 60-80 Feefe Ave., Milwaukee, Wis.
New Process Gear Corpn., Syracuse, N. Y.
Nilson-Miller Co., 1306 Hudson St., Hoboken, N. J.

—Bakelite
*BROWN, A. & F. CO., 79 Barclay St., New York, N. Y...*p. 303*
*CONTINENTAL FIBRE CO. (''Bakelite-Dilecto''), Newark, Del...*p. 418*
Crofoot Gear Works (Inc.), 1601 Hyde Park Ave., Readville, Mass.
*JAMES, D. O. MFG. CO., 1114-24 W. Monroe St., Chicago, Ill...*pp. 310, 311*
*JONES, W. A. FOUNDRY & MACHINE CO., 4415 West Roosevelt Road, Chicago, Ill... *pp. 312, 313, 314, 315*
*WESTINGHOUSE ELECTRIC & MFG. CO., East Pittsburgh, Pa...*pp. 160, 161*

—Bronze
*BROWN, A. & F. CO., 79 Barclay St., New York, N. Y...*p. 303*

—Cloth
Crofoot Gear Works, (Inc.,) 1601 Hyde Park Ave., Readville, Mass.
*GENERAL ELECTRIC CO. (''Fabroil''), Schenectady, N. Y...*pp. 18, 19, 20, 21*
*JAMES, D. O. MFG. CO., 1114-24 W. Monroe St., Chicago. Ill...*pp. 310, 311*
Meisel Press Mfg. Co., 952 Dorchester Ave., Boston, Mass.

—Cut
Akron Gear & Engineering Co., 44 East South Street, Akron, Ohio
Albaugh-Dover Co., 2100 Marshall Blvd., Chicago, Ill.
American Die & Tool Co., 2nd & Buttonwood Sts., Reading, Pa.
Bilgram Machine Works, 1235 Spring Garden St., Philadelphia, Pa.
Boston Gear Works (''Boston Gear''), Norfolk Downs, Mass.
*BROWN, A. & F. BROWN CO., 79 Barclay St., New York, N. Y...*p. 303*
BROWN & SHARPE MFG. CO., Providence, R. I...*p. 477*
Buffalo Gear & Pattern Works, 18 Elk St., Buffalo, N. Y.
Bultman, F. H. Co., 10271 Berea Road, Cleveland, Ohio
*CALDWELL, H. W. & SON CO., 17th & Western Ave., Chicago, Ill...*p. 370*
*CALDWELL, W. E. CO., 340 E. Brandeis St., Louisville, Ky...*p. 323*
*Carpenter-Tew Gear Co., 67 35th St., Brooklyn, N. Y.
Cedar Rapids Fdry. & Machine Co., 901-998 2nd Ave., Cedar Rapids, Ia.
Cincinnati Gear Co., 1825 Reading Road, Cincinnati, Ohio
Crofoot Gear Works (Inc.), 1601 Hyde Park Ave., Readville, Mass.
Cross Gear & Engine Co., 800-806 Bellevue Ave., Detroit, Mich.
Davis, Rodney, 626 Race St., Philadelphia, Pa.
Earle Gear & Machine Co., 4709 Stenton Ave., Philadelphia, Pa.
*FALLS CLUTCH & MACHINERY CO., Cuyahoga Falls, Ohio
*FAWCUS MACHINE CO., 2818 Smallman St., Pittsburgh, Pa...*p. 307*
*FOOTE BROS. GEAR & MACHINE CO., 213 N. Curtis St., Chicago, Ill...*pp. 308, 309*
Gleason Works, 1000 University Ave., Rochester, N. Y.
Grant Gear Works, 151 Pearl St., Boston, Mass.
Hamilton Gear Co., Ltd., 76 Van Horne St., Toronto, Can.
HERCULES MACHINE & TOOL CO. (Inc.), Broome & Lafayette Sts., New York, N. Y. ..*p. 476*
Higley Machine Co., South Norwalk, Conn.
*HILL CLUTCH CO., Cleveland, Ohio...*p. 331*
Hindley Gear Co., 1105 Frankford Ave., Philadelphia, Pa.
Holyoke Machine Co., Holyoke, Mass.
Horsburg & Scott Co., Cleveland, Ohio
*JAMES, D. O. MFG. CO., 1114-24 W. Monroe St. Chicago, Ill...*pp. 310, 311*
*JOHNSON, CARLYLE MACHINE CO., Manchester, Conn...*p. 332*
*JOLLY, J. & W. (Inc.), Holyoke, Mass... ..*p. 32*
*JONES, W. A. FOUNDRY & MACHINE CO., 4415 West Roosevelt Road, Chicago, Ill... *pp. 312, 313, 314, 315*
Lebanon Gear & Machine Works., 15th & Willow Sts., Lebanon, Pa.
Lyall, J. & W. Loom & Machine Co., Passaic, N J.
Machine Products Co., E. 179th St. & St. Clair Ave., Cleveland, Ohio
MEACHEM GEAR CORPN., Canal St. & West Shore Railroad, Syracuse, N. Y... *p. 318*
*MEDART PATENT PULLEY CO., St. Louis, Mo...*p. 333*
Meisel Press Mfg. Co., 952 Dorchester Ave., Boston, Mass.
Meisselbach-Catucci Mfg. Co., 57 Stanton St., Newark, N. J.

Digitized by Google

Michigan Gear & Engineering Co., 19 W. Woodridge St., Detroit, Mich.
New Process Gear Corpn., Syracuse, N. Y.
New York Gear Works, 56 Greenpoint Ave., Brooklyn, N. Y
NILES-BEMENT-POND CO., 111 Broadway, New York, N. Y...*p. 470*
Nilson-Miller Co., 1306 Hudson St., Hoboken, N. J.
Nuttall, R. D. Co., Pittsburgh, Pa.
Philadelphia Gear Works, 1120-24 Vine St., Philadelphia, Pa.
Plamondon, A. Mfg. Co., 5300 Western Boul., Chicago, Ill.
*POOLE ENGINEERING & MACHINE CO., Woodberry, Baltimore, Md...*pp. 316, 317*
Pullman Ventilator & Mfg. Co., W. York Ave. & W. M. R.R., York, Pa.
Pyott, Geo. W. Co., 1401 North Ave., Chicago, Ill
Simonds Mfg. Co., Liberty Ave. & 25th St., Pittsburgh, Pa.
Sommerfield Machine & Mfg. Co., 220 2nd Ave., Pittsburgh, Pa.
Spacke Machine & Tool Co., Indianapolis, Ind.
Stahl Gear & Machine Co., 1390 E. 40th St., Cleveland, Ohio
Tool Steel Gear & Pinion Co., Station P, Cincinnati, Ohio
Turley Gear & Machine Co., 1505 N. 10th St., St. Louis, Mo.
Union Gear & Machine Co., 27 Purchase St., Boston, Mass.
Woburn Gear Works, Woburn, Mass.
Woodward Machine Co., Wooster, Ohio

—Fibre

AMERICAN VULCANIZED FIBRE CO., Wilmington, Del...*p. 417*
*CALDWELL, W. E. CO., 340 E. Brandeis St., Louisville, Ky...*p. 323*
*CONTINENTAL FIBRE CO., Newark, Del...*p. 418*
DELAWARE HARD FIBRE CO. ("D. H. Egyptian"), Wilmington, Del...*p. 419*
DIAMOND STATE FIBRE CO. ("Condensite Celoron"), Bridgeport, Pa...*p. 420*
HERCULES MACHINE & TOOL CO. (Inc.), Broome & Lafayette Sts., New York, N. Y...*p. 476*
*JAMES, D. O. MFG. CO., 1114-24 W. Monroe St., Chicago, Ill...*pp. 310, 311*
*JONES, W. A. FOUNDRY & MACHINE CO., 4415 West Roosevelt Road, Chicago, Ill...*pp. 312, 313, 314, 315*

—Heat Treated

Crofoot Gear Works (Inc.), 1601 Hyde Park Ave., Readville, Mass.
FOOTE BROS. GEAR MACHINE CO., 213-21 N. Curtis St., Chicago, Ill...*pp. 308, 309*

—Helical

*JAMES, D. O. MFG. CO., 1114-24 W. Monroe St., Chicago, Ill...*pp. 310, 311*
*JONES, W. A. FOUNDRY & MACHINE CO., 4415 West Roosevelt Road, Chicago, Ill...*pp. 312, 313, 314, 315*
*KERR TURBINE CO., Wellsville, N. Y...*p. 123*

—Herringbone

*CALDWELL, H. W. & SON CO., 17th St. & Western Ave., Chicago, Ill...*p. 370*
*DE LAVAL STEAM TURBINE CO., Trenton, N. J...*p. 22*
FALK CORPORATION, Milwaukee, Wis...*pp. 304, 305*
*FAWCUS MACHINE CO., 2818 Smallman St., Pittsburgh, Pa...*p. 307*
*FOOTE BROS. GEAR & MACHINE CO., 213-21 N. Curtis St., Chicago, Ill...*pp. 308, 309*
*JAMES, D. O. MFG. CO., 1114-24 W. Monroe St., Chicago, Ill...*pp. 310, 311*
*JONES, W. A. FOUNDRY & MACHINE Co., 4415 West Roosevelt Road, Chicago, Ill...*pp. 312, 313, 314, 315*
*KERR TURBINE CO., Wellsville, N. Y...*p. 23*
POOLE ENGINEERING & MACHINE CO., Woodberry, Baltimore, Md...*pp. 316, 317*
*TERRY STEAM TURBINE CO., Hartford, Conn...*pp. 26, 27*
Turley Gear & Machine Co., 1505 N. 10th St., St. Louis, Mo.
WELLER MFG. CO., 1820-1856 N. Kostner Ave., Chicago, Ill...*p. 381*
Woodward Machine Co., Wooster, Ohio

—Molded

Bosworth Ard Mach. & Foundry Co., Anniston, Ala.
*BROWN, A. & F CO., 79 Barclay St., New York, N. Y...*p. 303*
*CALDWELL, H. W. & SON CO., 17th St. & Western Ave., Chicago, Ill...*p. 370*
*CALDWELL, W. E. CO., 340 E. Brandeis St., Louisville, Ky...*p. 323*
Christiana Machine Co., Christiana, Pa.
DODGE SALES & ENGINEERING CO., Mishawaka, Ind...*pp. 42, 43, 326, 327, 328, 329*
Ehrsam, J. B. & Sons Mfg., Enterprise, Kans.
*FULLER-LEHIGH CO., Fullerton, Pa...*p. 128*
*HILL CLUTCH CO., Cleveland, Ohio...*p. 331*
*JONES, W. A. FOUNDRY & MACHINE CO., 4415 West Roosevelt Rd., Chicago, Ill...*pp. 312, 313, 314, 315*
*MEDART PATENT PULLEY CO., St. Louis, Mo...*p. 333*
National Gear Wheel Foundry Walker & South Ave., N. S., Pittsburgh, Pa.
Plamondon, A. Mfg. Co., 5300 Western Blvd., Chicago, Ill.
POOLE ENGINEERING & MACHINE CO., Woodberry, Baltimore, Md...*pp. 316, 317*
WELLER MFG. CO., 1820-1856 N. Kostner Ave., Chicago, Ill...*p. 381*

—Railway Motor

HERCULES MACHINE & TOOL CO. (Inc.), Broome & Lafayette Sts., New York, N. Y...*p. 476*
Tool Steel Gear & Pinion Co., Station P, Cincinnati, Ohio

—Rawhide

Albaugh-Dover Co., 2100 Marshall Blvd., Chicago, Ill.
*BROWN, A. & F. CO., 79 Barclay St., New York, N. Y...*p. 303*
*CALDWELL, W. E. CO., 340 E. Brandeis St., Louisville, Ky...*p. 323*
*FOOTE BROS. GEAR & MACHINE CO., 213-21 N. Curtis St., Chicago, Ill...*pp. 308, 309*
Grant Gear Works, 151 Pearl St., Boston, Mass.
HERCULES MACHINE & TOOL CO. (Inc.), Broome & Lafayette Sts., New York, N. Y...*p. 476*
*JAMES, D. O. MFG. CO., 1114-24 W. Monroe St., Chicago, Ill...*310, 311*
*JONES, W. A. FOUNDRY & MACHINE CO., 4415 West Roosevelt Road, Chicago, Ill...*pp. 312, 313, 314, 315*
MEACHEM GEAR CORPN., Canal Street & West Shore Railroad, Syracuse, N. Y...*p. 318*
HERCULES MACHINE & TOOL CO. (Inc.), Broome & Lafayette Sts, New York, N. Y...*p. 476*
*JOHNSON, CARLYLE MACHINE CO., Manchester, Conn...*p. 332*
Western Rawhide & Belting Co., 901-935 Winnebago St., Milwaukee, Wis.
Woburn Gear Works, Woburn, Mass.

Digitized by Google

—Reverse

Pneumelectric Corpn., 219 Wyoming St., Syracuse, N. Y.
Paragon Gear Works ("Paragon"), Taunton, Mass.
POOLE ENGINEERING & MACHINE CO., Woodberry, Baltimore, Md...*pp. 316, 317*

—Speed Reduction

*BROWN, A. & F. CO., 79 Barclay St., New York, N. Y...*p. 303*
*CALDWELL, H. W. & SON CO., 17th St. & Western Ave., Chicago, Ill...*p. 370*
*CLEVELAND WORM & GEAR CO., Cleveland, Ohio...*p. 306*
*DE LAVAL STEAM TURBINE CO., Trenton, N. J...*p. 22*
DODGE SALES & ENGINEERING CO., Mishawaka, Ind...*pp. 42, 43, 326, 327, 328, 329*
FALK CORPORATION, Milwaukee, Wis...*pp. 304, 305*
*FAWCUS MACHINE CO., 2818 Smallman St., Pittsburgh, Pa...*p. 307*
*FOOTE BROS. GEAR & MACHINE CO., 213-21 N. Curtis St., Chicago, Ill...*pp. 308, 309*
Ganschow, Wm., Co., Washington Blvd. & Morgan St., Chicago, Ill.
*GENERAL ELECTRIC CO., Schenectady, N. Y...*pp. 18, 19, 20, 21*
General Machinery Mfg. Co., 920-22 N. Main St., St. Louis, Mo.
HERCULES MACHINE & TOOL CO. (Inc.), Broome & Lafayette Sts., New York, N. Y. *p. 475*
*JAMES, D. O. MFG. CO., 1114-28 W. Monroe St., Chicago, Ill...*pp. 310, 311*
*JONES, W. A. FOUNDRY & MACHINE CO., 4415 West Roosevelt Road, Chicago, Ill. *pp. 312, 313, 314, 315*
*KERR TURBINE CO. ("Economy"), Wellsville, N. Y...*p. 23*
Meisel Press Mfg. Co., 952 Dorchester Ave., Boston, Mass.
Mesta Machine Co., Box 1124, Pittsburgh, Pa.
*MOORE STEAM TURBINE CORP'N, Wellsville, N. Y...*pp. 24, 25*
Nuttall, R. D. Co., Pittsburgh, Pa.
OILGEAR COMPANY, 60-62-64 27th St., Milwaukee, Wis...*p. 483*
POOLE ENGINEERING & MACHINE CO. ("Turbo"), Woodberry, Baltimore, Md. *pp. 316, 317*
Sauer Power Generating Co., 5115 Rosetta St., Pittsburgh, Pa.
*TERRY STEAM TURBINE CO., Hartford, Conn...*pp. 26, 27*
Van Dorn & Dutton Co. ("Van Dorn"), Cleveland, Ohio
WELLER MFG. CO., 1820-1856 N. Kostner Ave., Chicago, Ill...*p. 381*

—Steel

*BROWN, A. & F. CO., 79 Barclay St., New York, N. Y...*p. 303*
*CALDWELL, W. E. CO., 340 E. Brandeis St., Louisville, Ky...*p. 323*
Carpenter-Tew Gear Co., 67 35th St., Brooklyn, N. Y.
DODGE SALES & ENGINEERING CO., Mishawaka, Ind...*pp. 42, 43, 326, 327, 328, 329*
FALK CORPORATION, Milwaukee, Wis...*pp. 304, 305*
*GENERAL ELECTRIC CO., Schenectady, N. Y...*pp. 18, 19, 20, 21*
HERCULES MACHINE & TOOL CO. (Inc.), Broome & Lafayette Sts., New York, N. Y. *p. 476*
*JAMES, D. O. MFG. CO., 1114-24 W. Monroe St., Chicago, Ill...*pp. 310, 311*
*JONES, W. A. FOUNDRY & MACHINE CO., 4415 West Roosevelt Road, Chicago, Ill. ..*pp. 312, 313, 314, 315*
*MORSE CHAIN CO., Ithaca, N. Y...*p. 321*
POOLE ENGINEERING & MACHINE IO., Woodberry, Baltimore, Md...*pp. 316, 317*
Van Dorn & Dutton Co. ("Van Dorn"), Cleveland Ohio
WELLER MFG. CO., 1820-1856 N. Kostner Ave., Chicago, Ill...*p. 381*

—Tractor

Crofoot Gear Works, (Inc.), 1601 Hyde Park Ave., Readville, Mass.
*FOOTE BROS. GEAR & MACHINE CO., 213-21 N. Curtis St., Chicago, Ill...*pp. 308, 309*
Ganshow, Wm. Co., Washington-Morgan St., Chicago, Ill.
Lavine Gear Co., 60-80 Keefe Ave., Milwaukee, Wis.

—Truck

Crofoot Gear Works (Inc.), 1601 Hyde Park Ave., Readville, Mass.
Lavine Gear Co., 60-80 Keefe Ave., Milwaukee, Wis.

—Valve, Locomotive

Pyle National Co. ("Young"), 1334 N. Kostner Ave., Chicago, Ill.

—Worm

Albaugh-Dover Co., 2100 Marshall Blvd., Chicago, Ill.
Baush Machine Tool Co., Springfield, Mass.
Boston Gear Works ("Boston Gear"), Norfolk Downs, Mass.
*BROWN, A. & F. CO., 79 Barclay St., New York, N. Y...*p. 303*
*CALDWELL, H. W. & SON CO., 17th St. & Western Ave., Chicago, Ill...*p. 370*
Cincinnati Gear Co., 1825 Reading Road, Cincinnati, Ohio
*CLEVELAND WORM & GEAR CO., Cleveland, Ohio...*p. 306*
Crofoot Gear Works (Inc.), 1601 Hyde Park Ave., Readville, Mass.
DODGE SALES & ENGINEERING CO., Mishawaka, Ind...*pp. 42, 43, 326, 327, 328, 329*
*FAWCUS MACHINE CO., 2818 Smallman St., Pittsburgh, Pa...*p. 307*
*FOOTE BROS. GEAR & MACHINE CO., 213-21 N. Curtis St., Chicago, Ill...*pp. 308, 309*
Ganshow, Wm. Co., Washington-Morgan St., Chicago, Ill.
General Machinery Mfg. Co., 920-22 N. Main St., St. Louis, Mo.
Grant Gear Works, 151 Pearl St., Boston, Mass.
HERCULES MACHINE TOOL CO. (Inc.), Broome & Lafayette Sts., New York, N. Y. *p. 476*
Hindley Gear Co., 1105 Frankford Ave., Philadelphia, Pa.
*JAMES, D. O. MFG. CO., 1114-24 W. Monroe St., Chicago, Ill...*pp. 310, 311*
*JONES, W. A. FOUNDRY & MACHINE CO., 4415 West Roosevelt Road, Chicago, Ill. *pp. 312, 313, 314, 315*
Newark Gear Cutting Machine Co., 65-75 Prospect St., Newark, N. J.
Nilson-Miller Co., 1306 Hudson St., Hoboken, N. J.
POOLE ENGINEERING & MACHINE CO., Woodberry, Baltimore, Md...*pp. 316, 317*
Simonds Mfg. Co., Liberty Ave. & 25th St., Pittsburgh, Pa.
WELLER MFG. CO., 1820-1856 N. Kostner Ave., Chicago, Ill...*p. 381*

Digitized by Google

GENERATING SETS (Electric)
*ALLIS-CHALMERS MFG. CO., Milwaukee, Wis...*pp. 28, 29*
*AMERICAN BLOWER CO., Detroit, Mich. *p. 553*
Buffalo Gasolene Motor Co., 1280 Niagara St., Buffalo, N. Y.
ENGBERG'S ELECTRICAL & MECHANICAL WORKS, 18 Vine St., St. Joseph, Mich...*pp. 6, 7*
ERIE ENGINE WORKS, Erie, Pa...*p. 8*
FAIRBANKS, MORSE & CO., 900 S. Wabash Ave., Chicago, Ill...*p. 41*
Fay & Bowen Engine Co., Geneva, N. Y.
Fisher Electrical Works, Detroit, Mich.
*GENERAL ELECTRIC CO., Schenectady, N. Y...*pp. 18, 19, 20, 21*
Gibb Instrument Co., 1016 East Palmer Ave., Detroit, Mich.
Howden, James & Co. (Ltd.), Wellsville, N. Y.
*KERR TURBINE CO., Wellsville, N. Y...*p. 23*
Langstadt Meyer Co., Appleton, Wis.
Safety Car Heating & Lighting Co., New Haven, Conn.
STURTEVANT, B. F. CO., Hyde Park, Boston, Mass...*p. 106*
*TERRY STEAM TURBINE CO., Hartford, Conn...*pp. 26, 27*
Universal Motor Co., Oshkosh, Wis.

GENERATOR COOLING SYSTEMS
ATMOSPHERIC CONDITIONING CORP'N, 435 Chestnut St., Philadelphia, Pa...*p. 617*
Carrier Air Conditioning Co., Buffalo, N. Y.
*SPRAY ENGINEERING CO. (''Spraco''), 60 High St., Boston, Mass...*pp. 166, 167*

GENERATORS
—Acetylene
BASTIAN-BLESSING CO. (''Rego''), 125 W. Austin Ave., Chicago, Ill...*p. 539*
Delcampe Welding Co., Bridgeport, Conn.
Economy Welding Machine Co., S. W. Blvd & Central, Kansas City, Mo.
MILBURN, ALEXANDER CO. (The), Baltimore, Md...*p. 540*
Ottumwa-Moline Engine & Pump Co., Ottumwa, Iowa
Oxweld Acetylene Co., 30 E. 42nd St., New York, N. Y.
Oxy-Carbi Co., New Haven, Conn.
SMITH'S INVENTIONS (Inc.), 2636 4th St., S. E., Minneapolis, Minn...*p. 541*
Thermalene Co., Chicago Heights, Ill.
—Electric
*ALLIS CHALMERS MFG. CO., Milwaukee, Wis...*pp. 28, 29*
Burke Electric Co., Erie, Pa.
Colonial Fan & Motor Co., Warren, Ohio
Crocker-Wheeler Co., Ampere, N. J.
Cushman Electric Co., 43 Main St., Concord, N. H.
*DE LAVAL STEAM TURBINE CO., Trenton, N. J...*p. 22*
Diehl Mfg. Co., Elizabethport, N. J.
Eck Dynamo & Motor Co., Belleville, N. J.
Electric-Dynamic Co., Bayonne, N. J.
Electric Machinery Mfg. Co., Minneapolis, Minn.
ENGBERG'S ELECTRIC & MECHANICAL WOQKS. 18 Vine St., St. Joseph, Mich. *pp. 6, 7*
FAIRBANKS, MORSE & CO., 900 S. Wabash Ave., Chicago, Ill...*p. 41*
*GENERAL ELECTRIC CO., Schenectady, N. Y...*pp. 18, 19, 20, 21*
Holt Electric Co., 377-379 S. Pierce St., Milwaukee, Wis.
Ideal Electric & Mfg. Co., Mansfield, Ohio
Jantz & Leist Electric Co., Cincinnati, Ohio
*KERR TURBINE CO., Wellsville, N. Y...*p. 23*
Kester Electric Co., 420 North 3rd St., Terre Haute, Ind.
Mechanical Appliance Co., Milwaukee, Wis.
Peerless Electric Co., Warren, Ohio
Reliance Electric & Engineering Co., 1088 Ivanhoe Road, Cleveland, Ohio
Ridgway Dynamo & Engine Co., Ridgway, Pa.
Robbins & Myers Co., Springfield, Ohio
Roth Bros. & Co., 1400 W. Adams St., Chicago, Ill.
Sprague Electric Works, 527 W. 34th St., New York, N. Y.
STURTEVANT, B. F. CO., Hyde Park, Boston, Mass...*p. 106*
Wells Mfg. Co., Fond du Lac, Wis.
Western Electric Co. (Inc.), 195 Broadway, New York, N. Y.
*WESTINGHOUSE ELECTRIC & MFG. CO., East Pittsburgh, Pa...*pp. 160, 161*
—Electric, Low Voltage
*GENERAL ELECTRIC CO., Schenectady, N. Y...*pp. 18, 19, 20, 21*
Jantz & Leist Electric Co., Cincinnati, Ohio
*WESTINGHOUSE ELECTRIC & MFG. CO., East Pittsburgh, Pa...*pp. 160, 161*
—Gas
Thermalene Co., Chicago Heights, Ill.
—Hydrogen
Burdett Mfg. Co., 309 St. Johns Court, Chicago, Ill.
ELECTROLABS CO., Pittsburgh, Pa...*p. 536*
—Oxy-Hydrogen
ELECTROLABS CO., Pittsurgh, Pa...*p. 536*
Shriver, T. & Co., 844 Hamilton St., Harrison, N. J.
SMITH'S INVENTIONS (Inc.), 2636 4th St., S. E., Minneapolis, Minn...*p. 541*
—Ozone
Electric Water Sterilizer & Ozone Co., Scottsdale, Pa.

GLASS BLOWING
Corning Glass Works, Corning, N. Y.

GLASS BLOWING MACHINES
Lynch Glass Machinery Co., Anderson, Ind.

GLASS CUTTING WHEELS
NORTON CO., Worcester, Mass...*pp. 489, 510*

GLASS GRADUATING MACHINERY
Burr Co., Champaign, Ill.

GLASS WORKS MACHINERY
Cox & Sons Co., 119 Lafayette Place, Philadelphia, Pa.
HOOVEN, OWENS, RENTSCHLER CO., Hamilton, Ohio...*p. 10*
Rosedale Fndry & Mach. Co., Columbus & Preble Aves., North Side, Pittsburgh, Pa.
Sommerfield Machine & Mfg. Co., 220 2nd Ave., Pittsburgh, Pa.

GLASSWARE (Technical)
Corning Glass Works, Corning, N. Y.
GRIEBEL INSTRUMENT CO., Carbondale, Pa...*p. 300*

GOVERNORS
—Accumulator
FISHER GOVERNOR CO., Marshalltown, Iowa...*p. 208*
—Air Compressor
*ALLIS-CHALMERS MFG. CO., Milwaukee, Wis...*pp. 28, 29*
CASH, A. W. CO., Decatur, Ill...*p. 205*
FOSTER ENGINEERING CO., Newark, N. J. *p. 209*
*INGERSOLL-RAND CO., 11 Broadway, New York, N. Y...*pp. 546, 547*
JARECKI MFG. CO., Erie, Pa...*pp. 178, 179*

Go

Digitized by Google

GOVERNORS (Continued)
*KIELEY & MUELLER (Inc.), (''Kieley''), 34 W. 13th St., New York, N. Y...*p. 212*
WESTINGHOUSE TRACTION BRAKE CO., Wilmerding, Pa...*pp. 550, 551*
—Elevator
FISHER GOVERNOR CO., Marshalltown, Iowa..*p. 208*
—Engine, Gas
Duplex Engine Governors Co. (Inc.), (''Simplex'', ''Duplex''), 36 Flatbush Ave., Brooklyn, N. Y.
JARECKI MFG. CO., Erie, Pa...*pp. 178, 179*
Massey Machine Co., Watertown, N. Y.
—Engine, Oil
Massey Machine Co., Watertown, N. Y.
—Engine, Steam
Eclipse Governor Co., Vicksburg, Mich.
Godfrey, Keeler Co., 70 Warren St., New York, N. Y.
Ideal Automatic Governor Co., 164 Emmet St., Newark, N. J
JARECKI MFG. CO., Erie, Pa...*pp. 178, 179*
Judson Governor Co., Rochester, N. Y.
*KIELEY & MUELLER (Inc.), (''Kieley''), 34 W. 13th St., New York, N. Y...*p. 212*
Knowlson & Kelly, Troy, N. Y.
Massey Machine Co., Watertown, N. Y.
PICKERING GOVERNOR CO., Portland, Conn...*p. 247*
PROVIDENCE ENGINEERING CORP'N, Providence, R. I...*p. 12*
Sinker Davis Co., 230 S. Missouri St., Indianapolis, Ind.
Vicksburg Governor Co., Vicksburg, Mich.
Waters Governor Co., 141 Milk St., Boston, Mass.
—Gas
Equitable Meter Co., 422 First Ave., Pittsburgh, Pa.
Luther Mfg. Co. (Inc.), 133 Railroad Ave., Olean, N. Y.
WILBRAHAM-GREEN BLOWER CO., Pottstown, Pa...*p. 559*
—Oil Burner
CASH, A. W. CO., Decatur, Ill...*p. 205*
FISHER GOVERNOR CO., Marshalltown, Iowa..*p. 208*
FOSTER ENGINEERING CO., Newark, N. J. *p. 209*
—Pump
Atlas Valve Co., 282-286 South St., Newark, N. J.
Albany Steam Trap Co., 317 N. Pearl St., Albany, N. Y.
Berry Engineering Co., Chester, Pa.
CASH, A. W. CO., Decatur, Ill...*p. 205*
Central Machine Co., 7th, Wood & Franklin Sts., Philadelphia, Pa.
Chaplin-Fulton Mfg. Co. (''Fulton''), Pittsburgh, Pa.
D'ESTE, JULIAN CO., 26 Canal St., Boston, Mass...*pp. 206, 207*
DUNHAM, C. A. CO., 230 East Ohio Street, Chicago Ill...*p. 227*
FISHER GOVERNOR CO. (''Fisher''), Marshalltown, Iowa..*p. 219*
*FORD REGULATOR CORP'N, 402 Broome St., New York, N. Y...*p. 176*
FOSTER ENGINEERING CO., Newark, N. J. *p. 209*
Gardner Governor Co., Quincy, Ill.
Ideal Automatic Governor Co., 164 Emmet St., Newark, N. J
*ILLINOIS ENGINEERING CO. (''Eclipse'') Chicago, Ill...*pp. 210, 211*
JARECKI MFG. CO., Erie, Pa. *pp. 178, 179*
*KIELEY & MUELLER (Inc.), (''Kieley''), 34 W. 13th St., New York, N. Y...*p. 212*
Klipfel Mfg. Co., 2651 W. Harris St., Chicago, Ill.
Locke Regulator Co. (''Boardman''), 76 North St., Salem, Mass.
McDonough Coal Saving Corp'n, 3960 Grand River Ave., Detroit, Mich.
MASON REGULATOR CO., Boston, Mass. *pp. 214, 215*
NORTHERN EQUIPMENT CO. (''Copes''), Erie, Pa...*p. 102*
Open Coil Heater & Purifier Co., Indianapolis, Ind...*p. 149*
Plouff Co., 1500 River St., Boston, Mass.
*RICHARDSON-PHENIX CO., 126 Reservoir Ave., Milwaukee, Wis...*pp. 248, 249*
''S-C'' REGULATOR MFG. CO., Fostoria, Ohio...*p. 103*
Shopp, W. A. & Co. (''Carr''), New Castle, Ind.
Squires, C. E. Co., E. 40th St. & Kelley Ave., Cleveland, Ohio
TAGLIABUE, C. J. MFG. CO., 18-88 33rd St., Brooklyn, N. Y...*p. 296*
Watson & McDaniel Co., 142 N. 7th St., Philadelphia, Pa.
WEBSTER, WARREN & CO., Camden, N. J. *pp. 154, 155*
Williams Gauge Co., 543 Fourth Ave., Pittsburgh, Pa.
Witt, G. E. Co. (Inc.), 862-64 Howard St., San Francisco, Cal.
Ziermore Valve Co., Media, Pa.
—Steam Turbine
*DE LAVAL STEAM TURBINE CO., Trenton, N. J...*p. 22*
Ideal Automatic Governor Co., 164 Emmet St., Newark, N. J.
Massey Machine Co., Watertown, N. Y.
PICKERING GOVERNOR CO., Portland, Conn...*p. 247*
*WESTINGHOUSE ELECTRIC & MFG. CO., East Pittsburgh, Pa...*pp. 160, 161*
—Water Wheel
Holyoke Machine Co., Holyoke, Mass.
*LEFFEL, JAMES & CO., Springfield, Ohio ..*p. 33*
Lombard Governor Co., Ashland, Mass.
PELTON WATER WHEEL CO., 1982 Harrison St., San Francisco, Cal...*pp. 34, 35*
*WESTINGHOUSE ELECTRIC & MFG. CO., East Pittsburgh, Pa...*pp. 160, 161*
Woodward Governor Co., Rockford, Ill.

GRADUATING MACHINES
Burr Co., Champaign, Ill.

GRAIN ELEVATOR EQUIPMENT
FAIRBANKS, MORSE & CO., 900 S. Wabash Ave., Chicago, Ill...*p. 41*
Smith, Philip Mfg. Co., Sidney, Ohio
UNION ENGINEERING CO., Cleveland, Ohio *p. 645*
WELLER MFG. CO., 1820-1856 N. Kostner Ave., Chicago, Ill...*p. 381*
Wolf Co., Chambersburg, Pa.

GRAIN HANDLING MACHINERY
Smith, Philip Mfg. Co., Sidney, Ohio

GRANULATORS
*ALLIS-CHALMERS MFG. CO., Milwaukee, Wis...*pp. 28, 29*
*SMIDTH, F. L. & CO., 50 Church St., New York, N. Y...*p. 604*
Stroud, E. H. & Co., 928-934 Fullerton Ave., Chicago, Ill.
—Sugar
Hersey Mfg. Co., So. Boston, Mass.
LOUISVILLE DRYING MACHINERY CO., Louisville, Ky...*p. 608*

GRAPHITE
—Boiler
Hill & Griffith Co., 1262 State Ave., Cincinnati, Ohio
United States Graphite Co., Saginaw, Mich.

Digitized by Google

—Flake (Lubricating)
Acheson Graphite Co., Niagara Falls, N. Y.
Cold Tank & Specialty Co., 117 S. Hanover St., Baltimore, Md.
Dixon Crucible Co., Joseph, Jersey City, N J.
Ilsley-Doubleday & Co., 229-231 Front St., New York, N. Y.
Obermayer, S. Co., Cincinnati, Ohio
—Stick
National Graphite Lubricator Co., Scranton, Pa.
GRATE SHAKERS, POWER (Locomotive)
Franklin Railway Supply Co., 17 E. 42nd St., New York, N. Y.
GRATES
—Dumping
AUTOMATIC FURNACE CO. (''Culver''), Dayton, Ohio..*pp. 112, 113*
Beggs, James & Co., 36 Warren St., New York, N. Y.
BROWNELL CO., Dayton, Ohio..*p. 59*
BUDD GRATE CO., 2013 E. Letterly St., Philadelphia, Pa...*p. 123*
Canton Crate Co., 1711 Dillow Pl., Canton, Ohio
*CASEY-HEDGES CO., Chattanooga, Tenn. *pp. 60, 61*
Chicago Tile Arch Furnace Co., 2600-10 W. Grand Ave., Chicago, Ill.
Cyclone Grate Bar Co., 8 Grimes St., Buffalo, N. Y.
FROST MFG. CO., 112 Adams St., Chicago, Ill...*pp. 68, 634*
G. M. C. Engineering Co., Graphic Arts Bldg., Worcester, Mass.
Godfrey, Keeler Co., 70 Warren St., New York, N. Y.
Heath Grate Bar Co., 12 Pearl St., Boston, Mass.
Herrick, Geo. S. Grate Co., 217 N. Franklin St., Syracuse, N. Y.
Hofft, M. A. Co., Indianapolis, Ind.
HULSON GRATE CO., Keokuk, Iowa..*pp. 124, 125*
*KEELER, E. CO., Williamsport, Pa...*p. 69*
KEWANEE BOILER CO., Kewanee, Ill...*pp. 622, 623, 624*
Kramer Bros. Foundry Co., 51 Dell St., Dayton, Ohio
McCLAVE-BROOKS CO. (''McClave's''), Scranton, Pa...*p. 126*
Martin Grate Co., 343 S. Dearborn St., Chicago, Ill.
Mershon Patent Shaking Grate Works, 5750-52 Westminster Ave., Philadelphia, Pa.
MURRAY IRON WORKS CO., Burlington, Iowa..*pp. 80, 81*
Neemes Bros. (Inc.), 218 1st St., Troy, N. Y.
NEWBURGH STEAM BOILER WORKS (P. Delany & Co.), Newburgh, N. Y...*p. 64*
Power Efficiency Corp'n, White Bldg., Buffalo, N. Y.
Pyramid Iron Products Corp'n, 2 Rector St., New York, N. Y.
Salamander Grate Bar Co., 126 Liberty St., New York, N. Y.
Shear-Klean Grate Co. (''Shear-Klean''), 811 Monadnock Bldg., Chicago, Ill.
Shevlin Engineering Co. (Inc.), 108 W. 34th St., New York, N. Y.
Thacher Propeller & Foundry Corp'n (''Albany''), Albany, N. Y.
*TITUSVILLE IRON WORKS CO., Titusville, Pa...*p. 89*
Treadwell, M. H. Co., 140 Cedar St., New York, N. Y.
Vasil Steam Systems Co., 314 Washington Loan & Trust Bldg., Washington, D. C.
*VOGT, HENRY MACHINE CO., Louisville, Ky...*p. 632, 633*
*WASHBURN & GRANGER (Inc.) (''Dean''), 50 Church St., New York, N. Y...*p. 127*

—Kiln
*CASEY-HEDGES CO., Chattanooga, Tenn. *pp. 60, 61*
McCLAVE-BROOKS CO. (''McClave's''), Scranton, Pa...*p. 126*
Mershon Patent Shaking Works, 5750-52 Westminster Ave., Philadelphia, Pa.

—Rocking
BROWNELL CO., Dayton, Ohio..*p. 59*
Kelly Foundry & Machine Co. (''Kelly''), E. Purl St., Goshen, Ind.
KEWANEE BOILER CO. (''Century''), Kewanee, Ill...*pp. 622, 623, 624*
Martin Grate Co., 343 S. Dearborn St., Chicago, Ill.
Mershon Patent Shaking Grate Works, 5750-52 Westminster Ave., Philadelphia, Pa.
MURRAY IRON WORKS CO., Burlington, Iowa..*pp. 80, 81*
Twin Fire Insurance Co. (''20th Century''), 1252 First National Bank Bldg., Chicago, Ill.

—Shaking
AUTOMATIC FURNACE CO. (''Culver''), Dayton, Ohio..*pp. 112, 113*
BASS FOUNDRY & MACHINE CO., Fort Wayne, Ind...*p. 57*
Beggs, James & Co., 36 Warren St., New York, N. Y.
Blakeslee Mfg., Du Quoin, Ill.
BROWNELL CO., Dayton, Ohio—*p. 59*
BUDD GRATE CO., 2013 E. Letterly St., Philadelphia, Pa...*p. 123*
Canton Grate Co., 1711 Dillon Pl., Canton, Ohio
*CASEY-HEDGES CO., Chattanooga, Tenn. *pp. 60, 61*
Cokal Stoker Co., 1029a N. Clark St., Chicago, Ill.
Cyclone Grate Bar Co., 9 Grimes St., Buffalo, N. Y.
*ERIE CITY IRON WORKS, Erie, Pa...*pp. 66, 67*
FROST MFG. CO., 112 W. Adams St., Chicago, Ill...*pp. 68, 634*
Godfrey, Keeler Co., 70 Warren St., New York, N. Y.
Hafer Foundry & Machine Works, Chambersburg, Pa.
Hansell Grate Co., 80 E. Jackson Blvd., Chicago, Ill.
Herrick, Geo. S. Grate Co., 217 N. Franklin St., Syracuse, N. Y.
HULSON GRATE CO., Keokuk, Iowa..*p. 124, 125*
INTERNATIONAL ENGINEERING WORKS (Inc.) (''MacDonald''), Framingham, Mass...*pp. 72, 73*
*KEELER, E. CO., Williamsport, Pa...*p. 69*
KEWANEE BOILER CO., Kewanee, Ill...*pp. 622, 623, 624*
Kramer Bros. Foundry Co., 51 Dell St., Dayton, Ohio
McCLAVE-BROOKS CO. (''McClave's''), Scranton, Pa...*p. 126*
McMillan, James & Co., 114 Clarkson Court, Chicago, Ill.
McNaughton Mfg. Co., Maryville, Tenn.
Marion Machine Foundry & Supply Co., Marion, Ind.
Martin Grate Co., 343 S. Dearborn St., Chicago, Ill.
Mershon Patent Shaking Grate Works, 5750-52 Westminster Ave., Philadelphia, Pa.
MURRAY IRON WORKS CO., Burlington, Iowa..*pp 80, 81*
National Foundry Mfg. & Supply Co., Williamsport, Pa.
Neemes Bros. (Inc.), 218 1st St., Troy, N. Y.
New England Roller Grate Co., Indian Orchard, Mass.

Digitized by Google

Perfection Grate & Supply Co. (''Perfection''), 164 Birnie Ave., Springfield, Mass.
Power Efficiency Corp'n (''Long's Duplex''), White Bldg., Buffalo, N Y.
Power Engineering Co., Railway Exchange, Chicago, Ill.
Reagan Grate Bar Co., South & Charlotte Sts., Philadelphia, Pa.
St. John Grate Bar Co., Machinery Dept. The Bourse, Philadelphia, Pa.
Salamander Grate Bar Co., 126 Liberty St., New York, N. Y.
Shear-Klean Grate Co., 811 Monadnock Bldg., Chicago, Ill.
*TITUSVILLE IRON WORKS CO. (''Acme''), Titusville, Pa...*p. 89*
Travis, G. E., Henry, Ill.
U. S. Rocking Grate Bar Co., 20 W. Jackson Blvd., Chicago, Ill.
*VOGT, HENRY MACHINE CO., Louisville, Ky ..*p. 632, 633*
*WASHBURN & GRANGER (Inc.), (''Dean''), 50 Church St., New York, N. Y...*p. 127*
*WICKES BOILER CO., Saginaw, Mich... *p. 93*

—Shaking & Dumping
Mershon Patent Shaking Grate Works, 5750-52 Westminster Ave., Philadelphia, Pa.

—Shaking, Circular
Mershon Patent Shaking Grate Works, 5750-52 Westminster Ave., Philadelphia, Pa.

—Shearing
Shear-Klean Grate Co., 811 Monadnock Bldg., Chicago, Ill

—Stationary
BUDD GRATE CO., 2013 E. Letterly St., Philadelphia, Pa...*p. 123*
*ERIE CITY IRON WORKS, Erie, Pa...*pp. 66, 67*
Pyramid Iron Products Corp'n, 2 Rector St., New York, N. Y.
*TITUSVILLE IRON WORKS CO., Titusville, Pa...*p. 89*

—Traveling
AUTOMATIC FURNACE CO. (''Model Chicago''), Dayton, Ohio...*pp. 112, 113*
Canton Grate Co., 1711 Dillon Pl., Canton, Ohio
Laclede-Christy Clap Products Co., 1673 Ry. Exchange Bldg., St. Louis, Mo.

—Water Tube
*CASEY-HEDGES CO., Chattanooga, Tenn. *pp. 60, 61*
Swan, John F., 10th St. & Duncannon Ave., Philadelphia, Pa.

GRATINGS, FLOOR
IRVING IRON WORKS CO. (''Subway''), 3rd & Dutchkill Creek, Long Island City, N. Y...*p. 662*

—Cast Iron
CLOW, JAMES B. & SONS, 534 S. Franklin St., Chicago, Ill...*pp. 230, 231*

GRAVEL SCREENING PLANTS
*ALLIS-CHALMERS MFG. CO, Milwaukee, Wis...*pp. 28, 29*
BARTLETT, C. O. & SNOW CO., Cleveland, Ohio..*p. 367*
Dull, Raymond W. Co., 111 W. Washington St., Chicago, Ill.
Galion Iron Works & Mfg. Co., Galion, Ohio
JEFFREY MFG CO., 904 N. 4th St., Columbus, Ohio..*pp. 376, 377*
Stephens-Adamson Mfg. Co., Aurora, Ill.
WELLER MFG. CO., 1820-1826 N. Kostner Ave., Chicago, Ill...*p. 381*

GREASE
Chard & Howe, 256 Front St., New York, N. Y.
COOK'S. ADAM SONS (''Albany''), 708-710 Washington St., New York, N Y...*p. 251*
Dexter Oil Co., 313 Sixth Ave., Pittsburgh, Pa.
Dixon, Joseph Crucible Co., Jersey City, N. J.
Engineering Supply Co., 2238 N. 9th St., Philadelphia, Pa.
Fisk Bros. Refining Co., 24 State St., New York, N Y.
Franklin Oil & Gas Co., Bedford, Ohio
Ilsley-Doubleday & Co., 229-231 Front St., New York, N. Y.
Keystone Lubricating Co., 21st, Clearfield & Lippincott Sts., Philadelphia, Pa.
Lynch-Clarisey Co., 3211-13 S. Wood St., Chicago, Ill.
Metalene Chemical Co., Cleveland, Ohio
Monarch Mfg. Co, Toledo, Ohio
Moore Oil Co., York St. & McLean Ave.. Cincinnati, Ohio
New York & New Jersey Lubricant Co., 165 Broadway, New York, N. Y.
New York Lubricating Oil Co., 116 Broad St., New York, N. Y.
Ohio Grease Co. (''Ohio''), Loudonville, Ohio
Oil City Oil & Grease Co., Oil City, Pa.
Philadelphia Grease Mfg. Co., 848-850 S. Swanson St., Philadelphia, Pa.
Standard Oil Co. of New York, 26 Broadway, New York, N. Y.
Star Oil Co., 342 N. Irving St., Chicago, Ill.
TIDE WATER OIL CO. (''Veedol''), 11 Broadway, New York, N. Y ..*pp. 252, 253*
Vacuum Oil Co., 61 Broadway, New York, N. Y.
Valvoline Oil Co., 60 Broadway, New York, N. Y.

—Graphite
Acheson Graphite Co. (''Gredag''), Niagara Falls, N. Y.
COOK'S ADAM SONS, 708-710 Washington St., New York, N. Y...*p. 251*
Harris, A. W. Oil Co., 326 S. Water St., Providence, R. I.
United States Graphite Co., Saginaw, Mich.

GREASE CUPS
BUCKEYE IRON & BRASS WORKS, Dayton, Ohio..*p. 168*
*CRANE CO., 836 S. Michigan Ave., Chicago, Ill...*pp. 170, 171, 172, 173*
Hunter Pressed Steel Co. (''Airspring,'' ''Crown''), Pierce & Linden Sts., Lansdale, Pa.
*LUNKENHEIMER CO. (''Ideal,'' ''Majestic,'' ''Lion''), Cincinnati, Ohio..*pp. 184, 185, 186, 187, 188, 189*
Ohio Grease Co. (''Ohio''), Loudonville, Ohio
*RICHARDSON-PHENIX CO., 126 Reservoir Ave., Milwaukee, Wis...*pp. 248, 249*
Swain Company, 443 W. 31st St., Chicago, Ill.

GRINDERS
—Knife (Wood Working)
Stockbridge Machine Co., 68 Abbott St., Worcester, Mass.

—Saw
ATKINS, E. C. & CO. (Inc.), Indianapolis, Ind...*p. 506*
Higley Machine Co., South Norwalk, Conn.
Hunter Saw & Machine Co.., 57th & Butler Sts., Pittsburgh, Pa.
Machinery Co. of America, Big Rapids, Mich.
*SIMONDS MFG. CO., Fitchburg, Mass...*p. 507*
Wardell Mfg. Co., 110-112 Hamilton Ave., Cleveland, Ohio

—Wood
Carthage Machine Co., Carthage, N. Y.
Mitts & Merrill, 816 S. Franklin St., Saginaw, Mich.

Digitized by Google

GRINDING AND SCREEN SEPARATION MACHINERY

Ehrsam, J. B. & Sons Mfg. Co., Enterprise, Kans.
*FULLER-LEHIGH CO., Fullerton, Pa...*p. 128*
*HENDRICK MFG. CO., Carbondale, Pa...*p. 653*
JEFFREY MFG. CO., 904 N. 4th St., Columbus, Ohio..*pp. 376, 377*
STURTEVANT MILL CO., Harrison Sq., Boston, 22, Mass...*pp. 600, 601*
WILLIAMS PATENT CRUSHER & PULVERIZER CO., St. Louis, Mo...*pp. 602, 603*

GRINDING MACHINERY

Abbe, Paul O. (Inc.), 30 Broad St., New York, N. Y
.BARTLETT, C. O. & SNOW CO., Cleveland, Ohio..*p. 367*
*BROWN, A. & F. CO. (''Cogswell Mill''), 79 Barclay St., New York, N. Y...*p. 303*
FULLER-LEHIGH CO., Fullerton, Pa...p. 128
JEFFREY MFG. CO., 904 N. 4th St., Columbus, Ohio..*pp. 376, 377*
McCool Co., 1796 East 90th St., Cleveland, Ohio.
PRATT & WHITNEY CO., 111 Broadway, New York, N. Y...*p. 471*
Ross, Chas. & Sons Co., 148-156 Classon Ave., Brooklyn, N. Y.
Sackett, A. J., 5th Ave. & First St., Baltimore, Md.
*SMIDTH, F. L. & CO., 50 Church St., New York, N. Y...*p. 604*
STURTEVANT MILL CO., Harrison Sq., Boston, Mass...*pp. 600, 601*

GRINDING MACHINES

Badger Tool Co., Beloit, Wis.
Besly, Charles H. & Co. (''Besly''), 118 N. Clinton St., Chicago, Ill
Ott Grinder Co., 217-221 W. 10th St., Indianapolis, Ind.

—Bench

*BUILDERS IRON FOUNDRY (''Builders''), Providence, R. I...*p. 277*
Challenge Machine Co., 5116 Springfield Ave., Philadelphia, Pa.
Clizbe Bros. Mfg. Co., Plymouth, Ind.
Diamond Machine Co., 9 Codding St., Providence, R. I.
Forbes & Myers, 173 Union St., Worcester, Mass.
NOBLE & WESTBROOK MFG. CO., Hartford, Conn...*p. 494*
NORTON CO., Worcester, Mass...*pp. 489, 510*
Partridge, E. O., 2047-2049 W. Lake St., Chicago, Ill.
Ransom Mfg. Co., Oshkosh, Wis.
Robertson, W. Machine & Foundry Co., 56-58 Rano Street, Buffalo, N. Y.
*ROYERSFORD FOUNDRY & MACHINE Co. (Inc.), 52 N. 5th St., Philadelphia, Pa...*pp 346, 347*
Standard Electric Tool Co., Cincinnati, Ohio
Upton & Gilman Machine Co., 587 Middlesex St., Lowell, Mass.
Webster & Perks Tool Co., 300 Center St., Springfield, Ohio

—Cam

LANDIS TOOL CO., Waynesboro, Pa...*p. 488*
NORTON CO., Worcester, Mass...*pp. 489, 510*

—Car Wheel

NORTON CO., Worcester, Mass...*pp. 489, 510*

Center

Standard Electric Tool Co., Cincinnati, Ohio

—Chaser

GEOMETRIC TOOL CO., New Haven, Conn. *pp. 498, 499*
*LANDIS MACHINE CO. (Inc.), Waynesboro, Pa...*pp. 496, 495*
NILES-BEMENT-POND CO., 111 Broadway, New York, N. Y...*p. 470*
Rickert-Shafer Co., 613 W. 11th St., Erie, Pa.

—Chucking

BRYANT CHUCKING GRINDER CO., Springfield, Vt...*p. 485*
Churchhill-Morgan-Crittsinger (Inc.), 309 Sawyer Bldg., Worcester, Mass.

—Crank Shaft

LANDIS TOOL CO., Waynesboro, Pa...*p. 488*
NORTON CO., Worcester, Mass...*pp. 489, 510*

—Cutlery

Hemming Bros. Co. (Inc.), New Haven, Conn.

—Cutter and Reamer

BROWN & SHARPE MFG. CO., Providence, R. I...*p 477*
Cincinnati Gear Cutting Machine Co., Cincinnati, Ohio
Cincinnati Milling Machine Co., Cincinnati, Ohio
Grand Rapids Grinding Machine Co., 23 Ottawa Ave., Grand Rapids, Mich.
Harris, H. E. Engineering Co., (''Harris''), 1047 Broad St., Bridgeport, Conn.
LANDIS TOOL CO., Waynesboro, Pa...*p. 488*
McDonough Mfg. Co., Eau Claire, Wis.
Matson Machine Co., Concord, N. H.
NORTON CO., Worcester, Mass...*pp. 489, 510*
Oakley Machine Tool Co., Oakley, Cincinnati, Ohio
WILMARTH & MORMAN CO., Grand Rapids, Mich...*p 490*

—Cylindrical

BROWN & SHARPE MFG. CO., Providence, R. I...*p. 477*
BRYANT CHUCKING CO., Springfield, Vt...*p. 485*
Cincinnati Grinder Co., Marburg Ave. & South St., Cincinnati, Ohio
Detroit Machine Tool Co., 6545 St. Antoine St., Detroit, Mich.
Fitchburg Grinding Machine Co., 76 Winter St. Fitchburg, Mass.
Greenlee Bros. & Co., Rockford, Ill.
LANDIS TOOL CO., Waynesboro, Pa...*p. 488*
McDonough Mfg. Co., Eau Claire, Wis.
Madison Machine Tool Co., 1245 E. Washington Ave., Madison, Wis.
NORTON CO., Worcester, Mass...*pp. 489, 510*
Ott Grinder Co., 217-221 W. 10th St., Indianapolis, Ind.
PRATT & WHITNEY CO., 111 Broadway, New York, N. Y...*p. 471*
Queen City Machine Tool Co., 1405 Sycamore St., Cincinnati, Ohio
Russell, Holbrook & Henderson (Inc.), 30 Church St., New York, N. Y.
Schmidt, B. L. Co., 419 W. 4th St., Davenport, Iowa
Webster & Perks Tool Co., 300 Center St., Springfield, Ohio

—Disc

Besly, Charles H. & Co. (''Besly''), 118 N. Clinton St., Chicago, Ill.
Gardner Machine Co., Beloit, Wis.
LANDIS TOOL CO., Waynesboro, Pa...*p. 488*
NILES-BEMENT-POND CO., 111 Broadway, New York, N. Y...*p. 470*

—Drill

Grand Rapids Grinding Machine Co., 23 Ottawa Ave., Grand Rapids, Mich.

Gr

Digitized by Google

GRINDING MACHINES (Continued)
LANDIS TOOL CO., Waynesboro, Pa...*p. 488*
LaSalle Tool Co., 541 2nd St., LaSalle, Ill.
Oliver Instrument Co. (''Oliver of Adrian''), Adrian, Mich.
Washburn Shops of the Worcester Polytechnic Institute, Worcester, Mass.
WILLMARTH & MORMAN CO. (''New Yankee''), Grand Rapids, Mich...*p. 490*

—Electric, Portable
Black & Decker Mfg. Co., Baltimore, Md.
CHICAGO PNEUMATIC TOOL CO. (''Little Giant''), 6 E. 44th St., New York, N. Y. *p. 548*
Cincinnati Electrical Tool Co., Freeman & Flint Sts., Cincinnati, Ohio
Clark, Jr., Electric Co., Jas., 520 W. Main St., Louisville, Ky.
Coates Clipper Mfg. Co., 237 Chandler St., Worcester, Mass.
Electric Blower Co., 352 Atlantic Ave., Boston, Mass.
Electro-Magnetic Tool Co., 2902 Carroll Ave., Chicago, Ill.
Forbes & Myers, 172 Union St., Worcester, Mass.
Haskins, R. G. Co., 27 S. Desplaines St., Chicago, Ill.
Hisey Wolf Machine Co., Cincinnati, Ohio
Neil & Smith Electric Tool Co., 813-815 Broadway, Cincinnati, Ohio
Standard Electric Tool Co., Cincinnati, Ohio
Stow Mfg. Co., 443 State St., Binghamton, N. J.
Temco Electric Motor Co., 66 Sugar St., Leipsic, Ohio
United States Electrical Tool Co., 2490 West 6th St., Cincinnati, Ohio
Van Dorn Electric Tool Co. (''Van Dorn''), Cleveland, Ohio
*WESTINGHOUSE ELECTRIC & MFG. CO., East Pittsburgh, Pa...*pp. 160, 161*
Wisconsin Electric Co., Racine, Wis.

—Flexible Shaft, Portable
Stow Flexible Shaft Co., 3452 Ludlow St., Philadelphia, Pa.
Webb Mfg. Co., 245-247 N. J. R. R. Ave., Newark, N. J.

—Floor
Bridgeport Safety Emery Wheel Co., 90 Knowlton St., Bridgeport, Conn.
*BUILDERS IRON FOUNDRY (''Builders''), Providence, R. I...*p. 277*
CHICAGO PULLEY & SHAFTING CO., 30 So. Clinton St., Chicago, Ill...*pp. 324, 325*
Leavitt Mfg. Co., 208-210 Griggs St., Urbana, Ill.
Luther Grinder Mfg. Co., 285 S. Water St., Milwaukee, Wis.
NOBLE & WESTBROOK MFG. CO., Hartford, Conn...*p. 494*
NORTON CO., Worcester, Mass...*pp. 489, 510*
Partridge, E. O., 2047-2049 W. Lake St., Chicago, Ill.
Production Machine Co., Greenfield, Mass.
Ransom Mfg. Co., Oshkosh, Wis.
St. Louis Machine Tool Co., 932 Loughborough Ave., St. Louis, Mo.
Springfield Mfg. Co., 317 Mt. Grove St., Bridgeport, Conn.
Standard Electric Tool Co., Cincinnati, Ohio
STERLING GRINDING WHEEL CO., Tiffin, Ohio...*p. 511*
Wade, American Tool Co., 311 Atlantic Ave., Boston, Mass.
Webster & Perks Tool Co., 300 Center St., Springfield, Ohio

—Hole and Face
BRYANT CHUCKING GRINDER CO., Springfield, Vt...*p. 485*
Churchill-Morgan-Crittsinger (Inc.), 309 Sawyer Bldg., Worcester, Mass.
LANDIS TOOL CO., Waynesboro, Pa...*p. 488*
Taylor & Fenn Co., Hartford, Conn.

—Internal
BRYANT CHUCKING GRINDER CO., Springfield, Vt...*p. 485*
Churchill-Morgan-Crittsinger (Inc.), 309 Sawyer Bldg., Worcester, Mass.
Cincinnati Grinder Co., Marburg Ave. & South St., Cincinnati, Ohio
Fraser, Warren F. Co., Westboro, Mass.
*HEALD MACHINE CO., Worcester, Mass. *pp. 486, 487*
LANDIS TOOL CO., Waynesboro, Pa...*p. 488*
Ott Grinder Co., 217-221 W. 10th St., Indianapolis, Ind.
Persons Arter Machine Co., 72 Commercial St., Worcester, Mass.
Rivett Lathe & Grinder Co., Brighton, Boston, Mass.
Schmidt, B. L. Co., 419 W. 4th St., Davenport, Iowa
Tranter Mfg. Co., 105 Water St., Pittsburgh, Pa.
Universal Grinding Machine Co., 67 Walnut St., Fitchburg, Mass.
Van Norman Machine Tool Co., Springfield, Mass.
Whitney, Baxter D. & Sons (Inc.), Winchendon, Mass.
Woods Engineering Co., 108 Patterson St., Alliance, Ohio

—Knife
ATKINS, E. C. & CO. (Inc.), Indianapolis, Ind...*p. 506*
Bridgeport Safety Emery Wheel Co., 90 Knowlton St., Bridgeport, Conn.

—Piston
LANDIS TOOL CO., Waynesboro, Pa...*p. 488 510*
NORTON CO., Worcester, Mass...*pp. 489, 510*

—Pneumatic, Portable
CHICAGO PENUMATIC TOOL CO. (''Little Giant''), 6 E. 44th St., New York, N. Y.
*INGERSOLL-RAND CO. (''Little David''), 11 Broadway, New York, N. Y...*pp. 546, 547*

—Profile
Barnes, William O., Leominster, Mass.
Fischer Machine Co., 310-316 N. 11th St., Philadelphia, Pa.
Wade, American Tool Co., 311 Atlantic Ave., Boston, Mass.

—Radial
LANDIS TOOL CO., Waynesboro, Pa...*p. 488*
Rivett Lathe & Grinder Co., Brighton, Boston, Mass.
VanNorman Machine Tool Co., Springfield, Mass.

—Roll
Hampden Corundum Wheel Co., Brightwood, Mass.
LANDIS TOOL CO., Waynesboro, Pa...*p. 488*
Lobdell Car Wheel Co., P. O. Box 965, Wilmington, Del.
NILES-BEMENT-POND CO., 111 Broadway, New York, N. Y...*p. 470*
NORTON CO., Worcester, Mass...*pp. 489, 510*

—Surface
Abrasive Machine Tool Co., East Providence, R. I.
Badger Tool Co., Beloit, Wis.
BLAKE & JOHNSON CO., Waterbury, Conn. *p. 491*
BLANCHARD MACHINE CO., Cambridge, 39, Mass...*p. 484*
BROWN & SHARPE MFG. CO., Providence, R. I...*pp. 477, 537*

Digitized by Google

Cleveland Machine Tool Works, 18511 Euclid Ave., Cleveland, Ohio
Diamond Machine Co., 9 Codding St., Providence, R. I.
Fraser, Warren F. Co., Westboro, Mass.
*HEALD MACHINE CO., Worcester, Mass. *pp. 486, 487*
LANDIS TOOL CO., Waynesboro, Pa...*p. 488*
LaSalle Tool Co. (''LaSalle''), 541 2nd St., LaSalle, Ill.
Manhattan Machine & Tool Works, 50 Market Ave., N. W., Grand Rapids, Mich.
National Machine Co., 135 Sheldon St., Hartford, Conn.
NOBLE & WESTBROOK MFG. CO., Hartford, Conn...*p. 494*
NORTON CO., Worcester, Mass...*pp. 489, 510*
Persona-Arter Machine Co., 72 Commercial St., Worcester, Mass.
PRATT & WHITNEY CO., 111 Broadway, New York, N. Y...*p. 471*
Reed-Prentice, Worcester, Mass.
Reid Brothers Co., Beverly, Mass.
St. Louis Machine Tool Co., 932 Loughborough Ave., St. Louis, Mo.
Springfield Mfg. Co., 317 Mt. Grove St., Bridgeport, Conn.
Standard Electric Tool Co., Cincinnati, Ohio
Universal Grinding Machine Co., 67 Walnut St., Fitchburg, Mass.
Victor Tool Co. (''Victor''), Waynesboro, Pa.
Walker, O. S. Co., Worcester, Mass.
WILMARTH & MORMAN CO., Grand Rapids, Mich...*p. 490*
Woods Engineering Co., 108 Patterson St., Alliance, Ohio

—Swing Frame
Pittsburgh Grinding Wheel Co., Rochester, Pa.

—Tap
Grand Rapids Grinding Machine Co., 23 Ottawa Ave., Grand Rapids, Mich.

—Tool
BLAKE & JOHNSON CO., Waterbury, Conn. ..*p. 491*
Bridgeport Safety Emery Wheel Co., 90 Knowlton St., Bridgeport, Conn.
*BUILDERS IRON FOUNDRY (''Builders''), Providence, R. I...*p. 277*
Challenge Machine Co., 5116 Springfield Ave., Philadelphia, Pa.
Clizbe Bros. Mfg. Co., Plymouth, Ind.
Forbes & Myers, 173 Union St., Worcester, Mass.
Gisholt Machine Co., Madison, Wis.
Hoppen, J. E. & Sons, 70-74 Main St., Belleville, N. J.
LANDIS TOOL CO., Waynesboro, Pa...*p. 488*
La Salle Tool Co., 541 2nd St., La Salle, Ill.
LeBlond, R. K. Machine Tool Co., Cincinnati, Ohio
Machinery Co. of America, Big Rapids, Mich.
Mummert, Dixon Co., Hanover, Pa.
NATIONAL ACME CO. (''Namco''), Cleveland, Ohio..*pp. 464, 465*
NILES-BEMENT-POND CO., 111 Broadway, New York, N. Y...*p. 470*
NOBLE & WESTBROOK MFG. CO., Hartford...*p. 494*
NORTON CO., Worcester, Mass...*pp. 489, 510*
Oakley Machine Tool Co., Oakley, Cincinnati, Ohio
Oesterlein Machine Co., 3301 Colerain Ave., Cincinnati, Ohio
Partridge, E. O., 2047-49 W. Lake St., Chicago, Ill.
Ransom Mfg. Co., Oshkosh, Wis.
*ROYERSFORD FOUNDRY & MACHINE CO. (Inc.), 52 N. 5th St, Philadelphia, Pa. ..*pp. 346, 347*
Springfield Mfg. Co., 317 Mt. Grove St., Bridgeport, Conn.
Steel Products Engineering Co., Springfield, Ohio
STERLING GRINDING WHEEL CO., Tiffin, Ohio...*p. 511*
Tabor Mfg. Co., 18th & Hamilton Sts., Philadelphia, Pa.

—Tool Post
Standard Electric Tool Co., Cincinnati, Ohio

—Universal
BROWN & SHARPE MFG. CO., Providence, R. I...*p. 477*
Cincinnati Grinder Co., Marburg Ave. & South St., Cincinnati, Ohio
Dauber Kratsch Co., Oshkosh, Wis.
Fraser, Warren F. Co., Westboro, Mass.
LANDIS TOOL CO., Waynesboro, Pa...*p. 488*
Middlesex Machine Co. (Inc.), Middletown, Conn.
Modern Tool Co., Erie, Pa.
NILES-BEMENT-POND CO., 111 Broadway, New York, N. Y...*p. 470*
Oesterlein Machine Co., 3301 Colerain Ave., Cincinnati, Ohio
Ott Grinder Co., 217-221 W. 10th St., Indianapolis, Ind.
Universal Grinding Machine Co., 67 Walnut St., Fitchburg, Mass.
Valley City Machine Works, 12-16 Campau Ave., Grand Rapids, Mich.
Walker, O. S. Co., Worcester, Mass.
Woods Engineering Co., 108 Patterson St., Alliance, Ohio
NORTON CO., Worcester, Mass...*pp. 489, 510*

—Vertical
PRATT & WHITNEY CO., 111 Broadway, New York, N. Y...*p. 471*

GRINDING PANS
(See Pans, Grinding)

GRINDING WHEEL DRESSERS
Calder, George H., Lancaster, Pa.
Challenge Machine Co., 5116 Springfield Ave., Philadelphia, Pa.
Cleveland Flue Cleaner Mfg. Co. (''Brisben Duplex''), Cleveland, Ohio
Desmond-Stephan Mfg. Co., Urbana, Ohio
Diamond Drill Carbon Co., 61 Park Row, New York, N. Y.
Machinery Co. of America, Big Rapids, Mich.
NORTON CO., Worcester, Mass...*pp. 489, 510*
STERLING GRINDING WHEEL CO., Tiffin, Ohio...*p. 511*

GRINDING WHEELS
Abrasive Co. (''Borolon'', ''Electron''), Bridesburg, Philadelphia, Pa.
American Emery Wheel Works, Providence, R. I.
Bay State Emery Wheel Co., 3 Winter St., Worcester, Mass.
Bridgeport Safety Emery Wheel Co., 90 Knowlton St., Bridgeport, Conn.
Carborundum Co., Niagara Falls, N. Y.
Chicago Wheel & Mfg. Co., 1101-1103 W. Monroe St., Chicago, Ill.
Commercial Grinding Wheel Co., 920-922 W. Ohio St., Chicago, Ill.
Hampden Corundum Wheel Co., Brightwood, Mass.
Hisey Wolf Machine Co., Cincinnati, Ohio
Luther Grinder Mfg. Co., 285 S. Water St., Milwaukee, Wis.
National Grinding Wheel Co. (Inc.), 2894 Main St., Buffalo, N. Y.
NORTON CO. (''Alundum'', ''Crystolon''), Worcester, Mass...*pp. 489, 510*
Peninsular Grinding Wheel Co., 253 Meldrum Ave., Detroit, Mich.
Pennsylvania Grinding Wheel Co., Wayne Junction, Philadelphia, Pa.
Pittsburgh Grinding Wheel Co., Rochester, Pa.

Gr

Digitized by Google

GRINDING WHEELS (Continued)
Safety Emery Wheel Co., Springfield, Ohio
Star Corundum Wheel Co., 241-261 Cavalry Ave., Detroit, Mich.
STERLING GRINDING WHEEL CO., Tiffin, Ohio...*p. 511*
Vitrified Wheel Co., Westfield, Mass.
White Heat Products Co., Westchester, Pa.
WHITE, S. S. DENTAL MFG. CO., 84 Market St., New York, N. Y...*p. 359*

—Artificial Abrasive
American Emery Wheel Works, Providence, R. I.
Star Corundum Wheel Co., 241-261 Cavalry Ave., Detroit, Mich.
STERLING GRINDING WHEEL CO. ("Sterbon", "Sterlith"), Tiffin, Ohio...*p. 511*

—Corundum
American Emery Wheel Works, Providence, R. I.
Bay State Emery Wheel Co., 3 Winter St., Worcester, Mass.
Maxf Grinding Wheel Corpn., Chester, Pa.
Star Corundum Wheel Co., 241-261 Cavalry Ave., Detroit, Mich.
Superior Corundum Wheel Co., Waltham, Mass.
Vitrified Wheel Co., Westfield, Mass.

—Elastic
Bay State Emery Wheel Co., 3 Winter St., Worcester, Mass.
Detroit Star Grinding Wheel Co., 241-261 Cavalry Ave., Detroit, Mich.
Maxf Grinding Wheel Corpn., Chester, Mass.
Peninsular Grinding Wheel Co., 253 Meldrum Ave., Detroit, Mich.
Waltham Grinding Wheel Co. ("Richardson"), 115 Bacon St,, Waltham, Mass.

—Emery
Bay State Emery Wheel Co., 3 Winter St., Worcester, Mass.
Peninsular Grinding Wheel Co., 253 Meldrum Ave., Detroit, Mich.
Pennsylvania Grinding Wheel Co., Wayne Junction, Philadelphia, Pa.
Superior Corundum Wheel Co., Waltham, Mass.
Walls, T. P. Tool & Supply Co., 75-77 Walker St., New York, N. Y.
White Heat Products Co., West Chester, Pa.

—Silicate
Detroit Star Grinding Wheel Co., 241-261 Cavalry Ave., Detroit, Mich.
NORTON CO., Worcester, Mass...*p. 489, 510*
Waltham Grinding Wheel Co., 115 Bacon St., Waltham, Mass.

—Vitrified
NORTON CO., Worcester, Mass...*p. 489, 510*
Waltham Grinding Wheel Co. ("Alowalt", "Carbowalt"), 115 Bacon St., Waltham, Mass.

GRINDSTONES, MOUNTED
Athol Machine & Foundry Co., Athol, Mass.
Cleveland Stone Co., 1886 Euclid Ave., Cleveland, Ohio
Hoppen, J. E. & Sons, 70-74 Main St., Belleville, N. J.

GUN MAKING MACHINERY
NILES BEMENT-POND CO., 111 Broadway, New York, N. Y...*p. 470*
NOBLE & WESTBROOK MFG. CO., Hartford, Conn...*p. 494*
Winchester Repeating Arms Co., New Haven, Conn.

GUN METAL FINISH
*AMERICAN METAL TREATMENT CO. ("Carbonia"), Elizabeth, N. J...*p. 535*

H

HACK SAW BLADES, FRAMES, ETC.
(See Blades, Frames, Etc., Hack Saw)

HAIR FELT
Keasbey, Robert A. Co., 445 West St., New York, N. Y.

HAMMERS

—Belt Driven
*Beaudry & Co. (Inc.), 45 Bromfield St., Boston, Mass.
*BRADLEY, C. C. & SON (Inc.), Syracuse, N. Y...*p. 446*

—Drilling and Chipping
Electro-Magnetic Tool Co., 2902 Carroll Ave., Chicago, Ill.

—Drop
*BLISS, E. W. CO., Brooklyn, N. Y...*pp. 438, 439*
Chambersburg Engineering Co., Chambersburg, Pa.
Erie Foundry Co., Erie, Pa.
Massillon Foundry & Machine Co., Massillon, Ohio
NILES-BEMENT-POND Co., 111 Broadway, New York, N. Y...*p. 470*
Standard Machinery Co., Auburn, R. I.

—Drop (Automatic)
*BLISS, E. W. CO., Brooklyn, N. Y...*pp. 438, 439*

—Drop (Board)
Chambersburg Engineering Co., Chambersburg, Pa.
*LONG & ALLSTATTER CO., Hamilton, Ohio ..*pp. 440, 441*
Massillon Foundry & Machine Co., Massillon, Ohio
NILES-BEMENT-POND CO., 111 Broadway, New York, N. Y...*p. 470*

—Helve
*LONG & ALLSTATTER CO., Hamilton, Ohio ..*pp. 440, 441*

—Motor Driven
Beaudry & Co. (Inc.), 45 Bromfield St., Boston, 9, Mass.
*BRADLEY, C. C. & SON (Inc.), Syracuse, N. Y...*p. 446*
Nazel Engineering & Machine Works, 4041 N. 5th St., Philadelphia, Pa.

—Pneumatic
Barr, H. Edsil, Erie, Pa.
CHICAGO PNEUMATIC TOOL CO. ("Boyer"), 6 E. 44th St., New York, N. Y...*p. 548*
Dayton Pneumatic Tool Co., Dayton, Ohio
Helwig Mfg. Co., St. Paul, Minn.
Independent Pneumatic Tool Co., 600 W. Jackson Blvd., Chicago, Ill.
*INGERSOLL-RAND CO. ("Little David"), 11 Broadway, New York, N. Y...*pp. 546, 547*
Keller Pneumatic Tool Co., Grand Haven, Mich.
Nazel Engineering & Machine Works, 4041 N. 5th St., Philadelphia, Pa.
SULLIVAN MACHINERY CO. ("Utility"), 120 S. Michigan Ave., Chicago, Ill...*p. 549*

—Power
Barr, H. Edsil, Erie, Pa.
Beaudry & Co. (Inc.), 45 Bromfield St., Boston, Mass.
*BRADLEY, C. C. & SON (Inc.), Syracuse, N. Y...*p. 446*
Dienelt & Eisenhardt (Inc.), 1804 18 N. Howard St., Philadelphia, Pa.
Justice, Philip S. & Co. ("Justice"), 421 Chestnut St., Philadelphia, Pa.

Digitized by Google

KEY BOILER EQUIPMENT CO., 27th & McCasland Ave., East St. Louis, Ill... *pp. 100, 101*
Little Giant Company, Mankato, Minn.
LONG & ALLSTATTER CO., Hamilton, Ohio ...*pp. 440, 441*
Moloch Company (''Mayer''), Kaukauna, Wis.
Nazel Engineering & Machine Works, 4041 N. 5t St., Philadelphia, Pa.
NILES-BEMENT-POND CO., 111 Broadway, New York, N. Y...*p. 470*
Scranton & Co., 42 Church St., New Haven, Conn.
United Hammer Co., Oliver Bldg., Boston, Mass.
West Tire Setter Co., Rochester, N. Y.

—Riveting (High Speed)
High Speed Hammer Co. (Inc.), 318 Norton St., Rochester, N. Y.

—Riveting and Chipping
Canton Pneumatic Tool Co., Canton, Ohio
Cleveland Pneumatic Tool Co., 6410 Hawthorne Ave., Cleveland, Ohio
Duntley-King Pneumatic Tool Co., 1143-45 Diversey Parkway, Chicago, Ill.
*INGERSOLL-RAND CO. (''Little David''), 11 Broadway, New York, N. Y...*pp. 546, ...547*
Oldham, George & Son Co., 4816-22 Tackawanna St., Frankford, Philadelphia, Pa.

—Steam
Chambersburg Engineering Co., Chambersburg, Pa.
Erie Foundry Co., Erie, Pa.
McDougall & Potter Co., 606-612 W. 55th St., New York, N. Y.
Massillon Foundry & Machine Co., Massillon, Ohio
NILES-BEMENT-POND CO., 111 Broadway, New York, N. Y...*p. 470*
SULLIVAN MACHINERY CO. (''Utility''), 120 S. Michigan Ave., Chicago, Ill...*p. 549*

—Steam (Double Frame)
NILES-BEMENT-POND CO., 111 Broadway, New York, N. Y...*p. 470*

HAND HOLE FITTINGS
KEY BOILER EQUIPMENT CO., 27th & McCasland Ave., East St. Louis, Ill...*pp. 100, 101*

HANDLES, MACHINE (Steel)
Cincinnati Ball Crank Co., Cincinnati, Ohio
Rockwood Sprinkler Co. of Mass., 34-35 Harlow St., Worcester, Mass.
WILLIAMS, J. H. & CO., 70 Richards St., Brooklyn, N. Y...*p. 517*

HANGERS
—Cable
Cameron Appliance Co. (''Bonita''), Everett, Mass.

—Door
Richards-Wilcox Mfg. Co., Aurora, Ill.
Wagner Mfg. Co., Cedar Falls, Iowa

—Door (Elevator)
Wagner Mfg. Co., Cedar Falls, Iowa

—Pipe
*BRAUN, C. F. & CO., San Francisco, Cal. ...*pp. 156, 157*
*CRANE CO., 836 S. Michigan Ave., Chicago, Ill...*pp. 170, 171, 172, 173*
Hawkins Pump Works, Downers Grove, Ill.
*PITTSBURGH VALVE, FOUNDRY & CONSTRUCTION CO., P. O. Box 1016, Pittsburgh, Pa...*pp. 192, 193*
U. S. Expansion Bolt Co., 189 Franklin St., New York, N. Y.

—Shaft
*ALLIS-CHALMERS MFG. CO., Milwaukee, Wis...*pp. 28, 29*
AMERICAN TOOL & MACHINE CO. (''American, Boston, Grant''), Boston 9, Mass...*p. 614*
Bon Foundry & Machine Co., Manheim, Pa.
*BROWN, A. & F. BROWN CO., 79 Barclay St., New York, N. Y...*p. 303*
*CALDWELL, H. W. & SON CO., 17th St. & Western Ave., Chicago, Ill...*p. 370*
*CALDWELL, W. E. CO., 340 E. Brandeis St., Louisville, Ky...*p. 323*
Cedar Rapids Fdry. & Machine Co., 901-998 2nd Ave., W., Cedar Rapids, Iowa
CHICAGO PULLEY & SHAFTING CO., 30 So. Clinton St., Chicago, Ill...*pp. 324, 325*
Dick, R. & J. Co. (Inc.), Passaic, N. J.
DODGE SALES & ENGINEERING CO., Mishawaka, Ind...*pp. 42, 43, 326, 327, 328, 329*
Fairmount Foundry & Engineering Works, 43 Second Ave., Woonsocket, R. I.
*FALLS CLUTCH & MACHINERY CO., Cuyahoga Falls, Ohio...*p. 330*
*HILL CLUTCH CO., Cleveland, Ohio...*p. 331*
JEFFREY MFG. CO., 904 N. 4th St., Columbus, Ohio...*pp. 376, 377*
*JONES, W. A. FOUNDRY & MACHINE CO., 4415 West Roosevelt Road, Chicago, Ill...*pp. 312, 313, 314, 315*
*MEDART PATENT PULLEY CO., St. Louis, Mo...*p. 333*
Naylor Bros., Peekskill, N. Y.
Olney & Warrin, 297-301 Lafayette St., New York, N. Y.
*ROYERSFORD FOUNDRY & MACHINE CO. (Inc.), 52 N. 5th St., Philadelphia, Pa...*pp. 346, 347*
*WOOD'S, T. B., SONS CO. (''Peerless''), Chambersburg, Pa...*pp. 334, 335*

—Shaft (Ball and Roller Bearing)
Transmission Ball Bearing Co. (Inc.), 1050 Military Road, Buffalo, N. Y.

—Shaft (Ball Bearing)
HYATT ROLLER BEARING CO. (''Hyatt''), New York, N. Y...*pp. 342, 343*
*S. K. F. INDUSTRIES (Inc.), (''S. K. F.''), 165 Broadway, New York, N. Y... *pp. 348, 349, 350*

HARDENING
*AMERICAN METAL TREATMENT CO., Elizabeth, N. J...*p. 535*
BARNES, WALLACE CO., Bristol, Conn... *p. 519*
Bidle, W. S. Co., 1411 E. 45th St., Clevelan, Ohio
*ROCKWELL, W. S. CO., 50 Church St., New York, N. Y...*p. 529*
WILLIAMS, J. H. & CO., 70 Richards St., Brooklyn, N. Y...*p. 517*

HARDENING SOLUTIONS (Steel)
Metal Hardening Solution Co., Bankers Place, Rochester, N. Y.

HARDNESS MEASURING INSTRUMENTS
(See Instruments, Hardness, Measuring)

HAWSERS
Durable Wire Rope Co. (''Durable Wire''), 95 Pearl St., Boston, Mass.

HEADERS
—Cast
*CRANE CO., 836 So. Michigan Ave., Chicago, Ill...*pp. 170, 171, 172, 173*

—Welded
Ballwood Co., 30 Church St., New York, N. Y.
*CRANE CO., 836 S. Michigan Ave., Chicago, Ill...*pp. 170, 171, 172, 173*
*DOUGHERTY, M. J. CO., 25th & Washington Ave., Philadelphia, Pa...*p. 334*
Mitchell, W. K. & Co., 2940 Ellsworth St., Philadelphia, Pa.

Ha

Digitized by Google

Pittsburgh Pipe Coil & Bending Co., P. O. Box 975, Pittsburgh, Pa.
*PITTSBURGH VALVE, FOUNDRY & CONSTRUCTION CO., P. O. Box 1016, Pittsburgh, Pa...*pp. 192, 193*
Power Piping Co., Beaver & Western Ave., Pittsburgh, Pa.
Riverside Boiler Works (Inc.), 491 Main St., Cambridge, Mass.
Shaw-Kendall Engineering Co., 120 S. Superior St., Toledo, Ohio
SIMMONS PIPE BENDING WORKS, 40 Mechanic St., Newark, N. J...*p. 235*

HEADING MACHINES

—Bolt
Boynton & Plummer (Inc.), Chester Depot, Vt.
Pawtucket Mfg. Co., 327 Pine St., Pawtucket, R. I.
Waterbury Farrel Foundry & Machine Co., 465 Bank St., Waterbury, Conn.

—Bolt (Hand)
Brown, H. B. Co., East Hampton, Conn.

—Cold
Cook, Asa S. Co., Hartford, Conn.
NILES-BEMENT-POND CO., 111 Broadway, New York, N. Y...*p. 470*

HEADING, UPSETTING AND FORGING MACHINES
Manville, E. J. Machine Co., Waterbury, Conn.
NILES-BEMENT-POND CO., 111 Broadway, New York, N. Y...*p. 470*

HEAT EXCHANGERS
Alberger Heater Co., 287 Chicago St., Buffalo, N. Y.
*BRAUN, C. F. & CO., San Francisco, Cal. ..*pp. 156, 157*
HOPE ENGINEERING & SUPPLY CO., Mt. Vernon, Ohio...*p. 49*
NATIONAL PIPE BENDING CO., New Haven, Conn...*pp. 150, 151*

HEAT TREATING
*AMERICAN METAL TREATMENT CO., Elizabeth, N. J...*p. 535*
ANTHONY CO., 138 West Ave., Long Island City, N. Y...*p. 530*
Bidle, W. S. Co., 1411 E. 45th St., Cleveland, Ohio
Connecticut Metal Treating Co. (Inc.), 207 Knowlton St., Bridgeport, Conn.
DOVE-SMITH & SON, Niagara Falls, N. Y. ..*p. 492*
Plumb, Fayette R., Bridesburg, P. O., Philadelphia, Pa.
*ROCKWELL, W. S. CO., 50 Church St., New York, N. Y...*p. 529*
Schwab, Gustav, 525 Market St., San Francisco, Cal.
Snead & Co., Iron Works, Foot of Pine St., Jersey City, N. J.
Tioga Steel & Iron Co., 52nd & Gray's Ave., Philadelphia, Pa.
TRANSUE & WILLIAMS STEEL FORGING CORPN., Alliance, Ohio...*p. 432*
WILLIAMS, J. H. & CO., 70 Richards St., Brooklyn, N. Y...*p. 517*
Winchester Repeating Arms Co., New Haven, Conn.

HEATERS

—Asphalt
CONNERY & CO. (Inc.), 2nd & Luzerne Sts., Philadelphia, Pa...*p. 651*
Estate F. H. Evans, 31-35 Hewes St., Brooklyn, N. Y.
KOVEN, L. O. & BROTHER, 154 Ogden Ave., Jersey City, N. J...*p. 605*
STUEBNER, G. L. IRON WORKS, Hancock St. & Vernon Ave., Long Island City, N. Y...*p. 408*

—Electric
Consolidated Car Heating Co., 413 N. Pearl St., Albany, N. Y.

—Feed Water (Closed)
Alberger Heater Co., 287 Chicago St., Buffalo, N. Y.
Alberger Pump & Condenser Co. ("Wainwright"), 140 Cedar St., New York, N. Y.
Berry Engineering Co. ("Berry"), Chester, Pa.
BIGGS BOILER WORKS CO., Case Ave. & Newton St., Akron, Ohio...*p. 650*
*BRAUN, C. F. & CO., San Francisco, Cal. ..*pp. 156, 157*
BROWNELL CO., Dayton, Ohio...*p. 59*
*CASEY-HEDGES CO., Chattanooga, Tenn. ..*pp. 60, 61*
FROST MFG. CO., 112 W. Adams St., Chicago, Ill...*pp. 68, 634*
Jacobs, Charles & Co. ("Jacobs"), 258 Franklin St., Boston, Mass.
Kelley, Benj. F. & Son, 25 Church St., New York, N. Y.
KROESCHELL BROS. CO., 460 West Erie St., Chicago, Ill...*p. 75*
MILWAUKEE RELIANCE BOILER WORKS ("Reliance"), Milwaukee, Wis...*p. 148*
Moffat Feed Water Heater & Purifier Co., Dayton, Ohio
MURRAY IRON WORKS CO., Burlington, Iowa...*pp. 80, 81*
NASON MFG. CO., 71 Fulton St., New York, N. Y...*p. 216*
*NATIONAL PIPE BENDING CO. ("National"), New Haven, Conn...*pp. 150, 151*
Nightingale & Childs Co., 205 Congress St., Boston, Mass.
Patterson, Frank L. & Co., 28 Cortandt St., New York, N. Y.
Patterson-Kelley Co., 26 Cortandt St., New York, N. Y.
Ross Heater & Mfg. Co. (Inc.), 1407 West Ave., Buffalo, N. Y.
*SCHUTTE & KOERTING CO., 1184 Thompson St., Philadelphia, Pa...*p. 159*
SIMS CO., Erie, Pa...*p. 152*
STANDARD WATER SYSTEMS CO. ("Standard Multicoil"), Hampton, N. J. ..*p. 144*
Stewart Heater Co. ("Otis"), No. Tonawanda, N. Y.
*WHEELER, C. H. MFG. CO., Sedgley & Lehigh Aves., Philadelphia, Pa...*p. 163*
*WHEELER CONDENSER & ENGINEERING CO., Carteret, N. J...*p. 162*
Whitlock Coil Pipe Co., Hartford, Conn.
*WORTHINGTON PUMP MACHINERY CORPN., 115 Broadway, New York, N. Y. ..*pp. 44, 45, 46, 47*

—Feed Water (Locomotive)
*SUPERHEATER COMPANY, 17 East 42nd St., New York, N. Y...*p. 98*
*WORTHINGTON PUMP & MACHINERY CORPN., 115 Broadway, New York, N. Y. ..*pp. 44, 45, 46, 47*

—Feed Water (Open)
Ohio Body & Blower Co., 9300 Detroit Ave., Cleveland, Ohio

—Gas (Garage)
Granger, A. D. Co., 15 Park Row, New York, N. Y.

—Glue
*GENERAL ELECTRIC CO., Schenectady, N. Y...*pp. 18, 19, 20, 21*
KOVEN, L. O. & BROTHER, 154 Ogden Ave., Jersey City, N. J...*p. 605*
NASON MFG. CO., 71 Fulton St., New York, N. Y...*p. 216*

—Juice
NATIONAL PIPE BENDING CO., New Haven, Conn...*pp. 150, 151*

Digitized by Google

—Juice (Tubular)
Murphy, John H. Iron Works, Magazine & Girod Sts., New Orleans, La.
SIMS CO., Erie, Pa...*p. 152*

—Oil
Amalgamated Machinery Corpn. (''Noko''), 215 No. Michigan Ave., Chicago, Ill.
ANTHONY COMPANY, 138 West Ave., Long Island City, N. Y...*pp. 530, 620*
*BRAUN, C. F. & CO., San Francisco, Cal...*pp. 156, 157*
*CASEY-HEDGES CO., Chattanooga, Tenn. *pp. 60, 61*
Coen Co. (Inc.), 112 Market St., San Francisco, Cal.
*LOCKETT, A. M. & CO. (''Nelson,'' ''Porcupine,'' ''Multi-Pass''), New Orleans, La. ..*p. 131*
*MAXON FURNACE & ENGRG. CO., Muncie, Ind...*pp. 532, 533*
*NATIONAL PIPE BENDING CO. (''National''), New Haven, Conn...*pp. 150, 151*
*SCHUTTE & KOERTING CO., 1184 Thompson St., Philadelphia, Pa...*p. 159*
SIMS CO., Erie Pa...*p. 152*
STANDARD WATER SYSTEMS CO., Hampton, N. J...*p. 144*

—Rivet (Electric)
American Car & Foundry Co., 165 Broadway, New York, N. Y.
*GENERAL ELECTRIC CO., Schenectady, N. Y...*pp. 18, 19, 20, 21*

—Rivet (Oil)
McKneat Manufacturing Co., Easton, Pa.

—Soldering Iron
AMERICAN GAS FURNACE CO., Elizabeth, N. J...*p. 527*

—Water Supply
Alberger Heater Co., 287 Chicago St., Buffalo, N. Y.
AMERICAN DISTRICT STEAM CO. (''Adsco''), North Tonawanda, N. Y...*p. 242*
*BRAUN, C. F. & CO., San Francisco, Cal. ..*pp. 156, 157*
Bryant Heater & Mfg. Co., 952 East 72nd St., Cleveland, Ohio
Kelley, Benj. F. & Son, 25 Church St., New York, N. Y.
KEWANEE BOILER CO. (''Tabasco''), Kewanee, Ill...*pp. 622, 623, 624*
*NATIONAL PIPE BENDING CO., New Haven, Conn...*pp. 150, 151*
Patterson, Frank L. & Co., 28 Cortlandt St., New York, N. Y.
Patterson-Kelley Co., 26 Cortlandt St., New York, N. Y.
SIMS CO., Erie, Pa...*p. 152*
*SMITH, H. B. CO., Westfield, Mass...*pp. 626, 627*
Sprado Engineering Co., 704 American Bank Bldg., Los Angles, Cal.
Standard Steam Specialty Co. (''Swenson-West''), 366 3rd Ave., New York, N. Y.
Weld, Geo. A. & Co., 79 Milk St., Boston, Mass.
Whitlock Coil Pipe Co., Hartford, Conn.

—Water Supply (Exhaust Gas)
SIMS CO., Erie, Pa...*p. 152*

—Water Supply (Garbage Burner)
KEWANEE BOILER CO., Kewanee, Ill... *pp. 622, 623, 624*

—Water Supply (Instantaneous)
*POWERS REGULATOR CO., 995 Architects Bldg., New York, N. Y...*pp. 222, 223*

HEATERS AND PURIFIERS (Open)

—Feed Water
BASS FOUNDRY & MACHINE CO., Fort Wayne, Ind...*p. 57*
BROWNELL CO., Dayton, Ohio...*p. 59*
*CASEY-HEDGES CO., Chattanooga, Tenn. ..*pp. 60, 61*
Colles Heater & Specialty Co., 343 S. Dearborn St., Chicago, Ill.
FROST MFG. CO., 112 W. Adams St., Chicago, Ill...*pp. 68, 634*
Griscom-Russell Co., 90 West St., New York, N. Y.
*H. S. B. W.-COCHRANE CORPN., Philadelphia, Pa...*pp. 146, 147*
Hoppes Mfg. Co., 19 Larch St., Springfield, O.
*KEELER, E. CO., Williamsport, Pa...*p. 69*
Linton Machine Co., 26 Cortlandt St., New York, N. Y.
MILWAUKEE RELIANCE BOILER WORKS (''Reliance''), Milwaukee, Wis...*p. 148*
Moffat Feed Water Heater & Purifier Co., Dayton, Ohio
*NATIONAL PIPE BENDING CO. (''National''), New Haven, Conn...*pp. 150, 151*
OPEN COIL HEATER & PURIFIER CO., Indianapolis, Ind...*p. 149*
Power Plant Specialty Co. (''Vater''), 1306 Monadnock Block, Chicago, Ill.
Ross Mfg. Co., Northville, Mich.
SIMS CO., Erie, Pa...*p. 152*
Standard Steam Specialty Co., 366 3rd Ave., New York, N. Y.
WEBSTER, WARREN & CO., Camden, N. J. *pp. 154, 155*
*WICKES BOILER CO., Saginaw, Mich... *p. 93*
*WORTHINGTON PUMP & MACHINERY CORPN., 115 Broadway, New York, N. Y. ..*pp. 44, 45, 46, 47*

—Feed Water (Metering)
*H. S. B. W.-COCHRANE CORPN. (''Cochrane''), Philadelphia, Pa...*pp. 146, 147*
*NATIONAL PIPE BENDING CO. (''National''), New Haven, Conn...*pp. 150, 151*

—Feed Water (Oil Extractor Combined)
Moffat Feed Water Heat & Purifier Co., Dayton, Ohio

HEATING AND VENTILATING APPARATUS

*AMERICAN BLOWER CO., Detroit, Mich. ..*p. 553*
American Radiator Co., 816-822 S. Michigan Ave., Chicago, Ill.
Carlisle & Gale Co., 5 North St., East Cambridge, Mass.
Carrier Air Conditioning Co., Buffalo, N. Y.
CLARAGE FAN CO., Kalamazoo, Mich...*pp. 556, 557*
Columbus Heating & Ventilating Co., 425-445 West Town St., Columbus, Ohio
Consolidated Engineering Co., 335 W. 28th Place, Chicago, Ill.
Garden City Fan Co., McCormick Bldg., Chicago, Ill.
Hammond Heating Co., 110 E. Second St., Cincinnati, Ohio
Hun, A. Berry Fan Co., 28 Binford St., Boston, Mass.
Industrial Air Engineering Co., 310-311 Perry Payne Bldg., Cleveland, Ohio
*KEELER, E. CO., Williamsport, Pa...*p. 68*
Massachusetts Blower Co., Howard St., Watertown, Mass.
Molby Boiler Co. (Inc.), 101 Park Ave., New York, N. Y.
NEW YORK BLOWER CO., Chicago, Ill... *p. 555*
Power Efficiency Corpn., White Bldg., Buffalo, N. Y.
SKINNER BROS. MFG. CO. (Inc.), 1400-1490 Vandevanter Ave., St. Louis, Mo... *p. 621*
*SMITH, H. B. CO., Westfield, Mass...*pp. 626, 627*
STURTEVANT, B. F. CO., Hyde Park, Boston, Mass...*p. 106*

He

Digitized by Google

Thermograde Valve Co., Howard St., Watertown, Mass.
WING, L. J. MFG. CO., 352 W. 13th St., New York, N. Y...*p. 107, 625*

HEATING DEVICES (Electric)
Ajax Electrothermic Corpn., 636 E. State St., Trenton, N. J.
*GENERAL ELECTRIC CO., Schenectady, N. Y...*pp. 18, 19, 20, 21*
Simplex Electric Heating Co., Cambridge, Mass.
*WESTINGHOUSE ELECTRIC & MFG. CO., East Pittsburgh, Pa...*pp. 160, 161*

HEATING MACHINES
AMERICAN GAS FURNACE CO., Elizabeth, N. J...*p. 527*

HEATING SPECIALTIES
Bishop & Babcock Co., E. 49th & Hamilton Ave., Cleveland, Ohio
CLOW, JAMES B. & SONS, 534 So. Franklin St., Chicago, Ill...*pp. 230, 231*
FOSTER ENGINEERING CO., Newark, N. J. ..*p. 209*
FULTON CO., Knoxville, Tenn...*pp. 218, 219*
Gurney Heater Mfg. Co., 188-200 Franklin St., Boston, Mass.
Hoffman Specialty Co., Waterbury, Conn.
United States Radiator Corpn., 35 E. Grande River Ave., Detroit, Mich.

—Vacuum
FOSTER ENGINEERING CO., Newark, N. J. ..*p. 209*
*ILLINOIS ENGINEERING CO. (''Illinois''), Chicago, Ill...*pp. 210, 211*
McAlear Mfg. Co., 1901 S. Western Ave., Chicago, Ill.

HEATING SYSTEMS
—Air Return
Columbus Heating & Ventilating Co., 425-445 West Town St., Columbus, Ohio
Donnelly Systems Co., 9 Murray St., New York, N. Y.
*KEELER, E. CO., Williamsport, Pa.
Positive Differential System Co., 9 Murray St., New York, N. Y.

—Direct Fired
SKINNER BROS. MFG. CO. (Inc.), 1400-1490 Vandevanter Ave., St. Louis, Mo... *p. 621*

—Exhaust Steam
AMERICAN DISTRICT STEAM CO., North Tonawanda, N. Y...*p. 242*
Tyler Underground Heating System, 815 S Canal St., N. S., Pittsburgh, Pa.

—Oil Circulation
Parks-Cramer Co., 970 Main St., Fitchburg, Mass.

—Steam
Borromite Co. of America, 105 West Monroe St., Chicago, Ill.
Consolidated Engineering Co., 835 W. 28th Place, Chicago, Ill.
Grinnell Co., Providence, R. I.
*KEELER, E. CO., Williamsport, Pa...*p. 69*
SKINNER BROS. MFG. CO. (Inc), 1400-1490 Vandevanter Ave., St. Louis, Mo... *p. 621*
WEBSTER, WARREN & CO., Camden, N. J. ..*pp. 154, 155*

—Vacuum
Bishop & Babcock Co., E. 49th & Hamilton Ave., Cleveland, Ohio
Consolidated Engineering Co., 835 W. 28th Place, Chicago, Ill.
Donnelly Systems Co., 9 Murray St., New York, N. Y.
DUNHAM, C. A. CO., 230 East Ohio Street, Chicago, Ill...*p. 227*
*KEELER, E. CO., Williamsport, Pa...*p. 69*
Positive Differential System Co., 9 Murray St., New York, N. Y.
Richardson & Boynton Co., 260 Fifth Ave., New York, N. Y.
Thermograde Valve Co., Howard St., Watertown, Mass.
Trane Co., La Crosse, Wis.
Vapor-Vacuum Heating Co., 401 Otis Bldg., Philadelphia, Pa.
WEBSTER, WARREN & CO., Camden, N. J. ..*pp. 154, 155*

—Vapor
Bishop & Babcock Co., E. 49th & Hamilton Ave., Cleveland, Ohio
Richardson & Boynton Co., 260 Fifth Ave., New York, N. Y.

—Warm Air
Hammond Heating Co., 110 E. Second St., Cincinnati, Ohio

HERRINGBONE GEARS
(See Gears, Herringbone)

HICKORY PRODUCTS
Minton, T. W. & Co., Barbourville, Ky.

HOBBING MACHINES
BARBER-COLMAN, Rockford, Ill...*pp. 474, 475*

HOBS
BARBER-COLMAN CO., Rockford, Ill...*pp. 474, 475*
BROWN & SHARPE MFG. CO., Providence, R. I...*p. 477*
ILLINOIS TOOL WORKS, 154 E. Erie St., Chicago, Ill...*p. 503*
Meissebach-Catucci Mfg. Co., 57 Stanton St., Newark, N. J.
Michigan Tool Co., 404 E. Jefferson Ave., Detroit, Mich.

—Thread Milling
Davidson Tool Mfg. Corpn., 120-124 Maiden Lane, New York, N. Y.
ILLINOIS TOOL WORKS, 154 E. Erie St., Chicago, Ill...*p. 503*

HOISTING ENGINES
(See Engines, Hoisting)

HOISTING MACHINERY
*ALLIS-CHALMERS MFG. CO., Milwaukee, Wis...*pp. 28, 29*
Box, Wm. A. Iron Works Co., 23rd & Blake Sts., Denver, Colo.
Erie Hoist Co., 2101 Holland St., Erie, Pa.
Horton, John T. Co., 242 Bradhurst Ave., New York, N. Y.
HUNT, C. W. CO. (Inc.), West New Brighton, Staten Island, N. Y...*pp. 374, 375*
*LIDGERWOOD MFG. CO., 96 Liberty St., New York, N. Y...*p. 388*
MARIS BROS. (Inc.), 3546 Grays Ave., Philadephia, Pa...*p. 395*
MORRIS, HERBERT (Inc.), 1-15 Lawrence Place, Buffalo, N. Y...*p. 402*
Mundy, J. S. Hoisting Engine Co., 722 Frelinghuysen Ave., New York, N. Y.
Myrick Machine Co., Olean, N. Y.
*NORTHERN ENGINEERING WORKS, Detroit, Mich...*p. 397*
Potter Mfg. Co., 3511 E. Washington St., Indianapolis, Ind.
Reliance Engineering Co., Lansing, Mich.
ROBINS CONVEYING BELT CO., Park Row Bldg., New York, N. Y...*p. 378*
*SEDGWICK MACHINE WORKS, 146 W. 15th St., New York, N. Y...*p. 407*
*SHEPARD ELECTRIC CRANE & HOIST CO., Montour Falls, N. Y...*pp. 400, 401*
Speidel, J. G., Reading, Pa.
Williams, G. H. Co., P O. Box 711, Erie, Pa.
Wunsch & Washburn (''Silent Hoist''). Stone Ave. & McDougal St., Brooklyn, N. Y.

Digitized by Google

HOISTING OUTFITS
*NOVO ENGINE CO., Lansing, Mich...*pp. 586, 587*

HOISTS

—Air
CHICAGO PNEUMATIC TOOL CO. ("Little Giant"), 6 East 44th St., New York, N. Y...*p. 548*
Coburn Trolley Track Mfg. Co., Holyoke, Mass.
CONNELLSVILLE MFG. & MINE SUPPLY CO., Connellsville, Pa. *p. 384*
Curtis Pneumatic Machinery Co., St. Louis, Mo.
Dake Engine Co., Grand Haven, Mich.
Detroit Hoist & Machine Co., 8201 Morrow St., Detroit, Mich.
Hanna Engineering Works ("Q. M. S."), 1765 Elston Ave., Chicago, Ill.
Harris Ice Machine Works, 174 E. Water St., Portland, Ore.
INGERSOLL-RAND CO. ("Little David," "Little Tugger"), 11 Broadway, New York, N. Y...*pp. 546, 547*
*LIDGERWOOD MFG. CO., 96 Liberty St., New York, N. Y...*p. 388*
MORRIS HERBERT (Inc.), 1-15 Lawrence Place, Buffalo, N. Y...*p. 402*
NORDBERG MFG. CO., Milwaukee, Wis...*p. 11*
*NORTHERN ENGINEERING WORKS, Detroit, Mich...*p. 397*
Utility Mfg. Co., Cudahy, Wis.
*WASHBURG & GRANGER (Inc.), 50 Church St., New York, N. Y...*p. 127*

—Ammunition
*LIDGERWOOD MFG. CO., 96 Liberty St., New York, N. Y...*p. 388*
*SEDGWICK MACHINE WORKS, 146 W. 15th St., New York, N. Y...*p. 407*

—Ash Can
*WASHBURN & GRANGER (Inc.), ("Dean"), 50 Church St., New York, N. Y...*p. 127*

—Belt
CHAMBERS BROS. CO., Philadelphia, Pa...*p. 599*
*LIDGERWOOD MFG. CO., 96 Liberty St., New York, N. Y...*p. 388*
MORRIS, HERBERT (Inc.), 1-15 Lawrence Place, Buffalo, N. Y...*p. 402*
Universal Hoist & Mfg. Co., Cedar Falls, Ia.

—Cargo (Electric)
CONNELLSVILLE MFG. & MINE SUPPLY CO., Connellsville, Pa...*p. 384*
Flory, S. Mfg. Co., Bangor, Pa.
*LIDGERWOOD MFG. CO., 96 Liberty St., New York, N. Y...*p 388*
Maine Electric Co, 25-35 Commercial St., Portland, Me.
MORRIS, HERBERT (Inc.), 1-15 Lawrence Place, Buffalo, N. Y...*p. 402*

—Chain
BOX, ALFRED & CO. (Inc.), Philadelphia, Pa...*p. 394*
Chisholm & Moore Mfg. Co., 5046 Lakeside Ave., N. E., Cleveland, Ohio
FORD CHAIN BLOCK CO., Second & Diamond Sts., Philadelphia, Pa...*p. 404*
Franklin Portable Crane & Hoist Co., Franklin, Pa.
Harrington, Edwin Son & Co. (Inc.), S. W. Cor. 17th & Callowhill St., Philadelphia, Pa.
Hobbs, Clinton E. Co., 12 Pearl St., Boston, Mass.
*LIDGERWOOD MFG. CO., 96 Liberty St., New York, N. Y...*p. 388*
MARIS BROS. (Inc.), 5546 Grays Ave., Philadelphia, Pa...*p. 395*
Moore, Franklin Co., Winsted, Conn.
MORRIS, HERBERT (Inc.), 1-15 Lawrence Place, Buffalo, N. Y...*p. 402*
NEWHALL CHAIN FORGE & IRON CO., 90 West St., New York, N. Y. *p. 410*
NEW JERSEY FOUNDRY & MACHINE CO., 90 West St., New York, N. Y...*p. 396*
*READING CHAIN & BLOCK CORPN. ("Reading"), Reading, Pa...*p. 403*
Round, D. & Son, Cleveland, Ohio
Salisbury Foundry & Machine Co., Salisbury, Md.
Speidel, J. G. ("Simplex"), Reading, Pa.
Wright Mfg. Co., Lisbon, Ohio
*YALE & TOWNE MFG. CO., Stamford, Conn...*p. 405*

—Chain (Multiple Gear)
FORD CHAIN BLOCK CO ("Tribloc"), Second & Diamond Sts., Philadelphia, Pa...*p. 404*
Hobbs, Clinton E. Co., 12 Pearl St., Boston, Mass.
MORRIS, HERPERT (Inc.), 1-15 Lawrence Place, Buffalo, N. Y...*p. 402*
*READING CHAIN & BLOCK CORPN. ("Reading"), Reading, Pa...*p. 403*

—Coal (Electric)
CONNELLSVILLE MFG. & MINE SUPPLY CO., Connellsville, Pa...*p. 384*
HUNT, C. W. CO. (Inc.), West New Brighton, Staten Island, N. Y...*pp. 374, 375*
*LIDGERWOOD MFG. CO., 96 Liberty St., New York, N. Y...*p. 388*
Maine Electric Co., 25-35 Commercial St., Portland, Me.
MORRIS, HERBERT (Inc.), 1-15 Lawrence Place, Buffalo, N. Y...*p. 402*
*SHEPARD ELECTRIC CRANE & HOIST CO., Montour Falls, N. Y...*pp. 400, 401*

—Double Platform
*LIDGERWOOD MFG. CO., 96 Liberty St., New York, N. Y...*p. 388*
*SEDWICK MACHINE WORKS, 146 W. 15th St., New York, N. Y...*p. 407*
Universal Hoist & Mfg. Co., Cedar Falls, Ia.

—Electric
Albro-Olem Elevator Co., Erie Ave. & D St., Philadelphia, Pa.
*ALLIS-CHALMERS MFG. CO., Milwaukee, Wis...*pp. 28, 29*
AMERICAN HOIST & DERRICK Co., St. Paul, Minn...*p. 383*
American Manufacturing & Engineering Co., Goshen, Ind.
Barber-Foster Engineering Co., 318 Stuyvesant Bldg., Cleveland, Ohio
Barney & Co., 477 Eighth Ave., New York, N. Y.
BOX, ALFRED & CO. (Inc.), Philadelphia, Pa...*p. 394*
*BROWN HOISTING MACHINERY CO., Cleveland, Ohio...*p. 390*
Browning, Victor R. Engrg. Co., 17701 Lake Shore Blvd., Cleveland, Ohio
Byers, John F. Machine Co., Ravenna, Ohio
CONNELLSVILLE MFG. & MINE SUPPLY CO., Connellsville, Pa...*p. 384*
Denver Engineering Works Co., 30th & Blake Sts., Denver, Colo.
Detroit Hoist & Machine Co., 8201 Morrow St., Detroit, Mich.
Euclid Crane & Hoist Co., Euclid, Ohio
FAIRBANKS, MORSE & CO., 900 S. Wabash Ave., Chicago, Ill...*p. 41*
Flory, S. Mfg. Co., Bangor, Pa.
GILLIS & GEOGHEGAN, 543 W. Broadway, New York, N. Y...*p. 406*
Granger, A. D. Co., 15 Park Row, New York, N. Y.
HUNT, C. W. CO. (Inc.), West New Brighton, Staten Island, N Y...*pp. 374, 375*
Lakeside Bridge & Steel Co., 404 Villard Ave., North Milwaukee, Wis.

Ho

Digitized by Google

HOISTS (Continued)
Lambert Hoisting Engine Co., 115 Poinier St., Newark, N. J.
*LIDGERWOOD MFG. CO., 96 Liberty St., New York, N. Y...*p. 388*
Maine Electric Co., 25-35 Commercial St., Portland, Me.
MARIS BROS. (Inc.), 5546 Grays Ave., Philadelphia, Pa...*p. 395*
Milwaukee Electric Crane & Mfg. Co., 60th & Greenfield Ave., Milwaukee, Wis.
Moore, Franklin Co., Winsted, Conn.
MORRIS, HERBERT (Inc.), 1-15 Lawrence Place, Buffalo, N. Y...*p. 402*
NEW JERSEY FOUNDRY & MACHINE CO., 90 West St., New York, N. Y...*p. 396*
NILES-BEMENT-POND CO., 111 Broadway, New York, N. Y...*p. 470*
NORDBERG MFG. CO., Milwaukee, Wis...*p. 11*
*NORTHERN ENGINEERING WORKS, Detroit, Mich...*p. 397*
O. K. Clutch & Machinery Co., Columbia, Pa.
Orr & Sembower (Inc.), Reading, Pa.
OTTUMWA IRON WORKS (Inc.), Ottumwa, Iowa...*p. 385*
Parker, S. E., 3830 N. Kilbourn Ave., Chicago, Ill.
Patten Mfg. Co., Chattanooga, Tenn.
*PAWLING & HARNISCHFEGER CO. ("P. & H."), Milwaukee, Wis...*p. 398*
Pneumelectric Corporation, 219 Wyoming St., Syracuse, N. Y.
*READING CHAIN & BLOCK CORPN. ("Reading"), Reading, Pa...*p. 403*
ROBINS CONVEYING BELT CO., Park Row Bldg., New York, N. Y...*p. 373*
Roeper Crane & Hoist Works, 1722-38 No. 10th St., Reading, Pa.
*SHEPARD ELECTRIC CRANE & HOIST CO., Montour Falls, N. Y...*pp. 400, 401*
Sprague Electric Works, 527 W. 34th St., New York, N. Y.
Stamp, Charles E. & Co., Citizens Bldg., Cleveland, Ohio
Stamp Electric Hoist Co., 1500-17th St., San Francisco, Cal.
Thomas Elevator Co., 22 S. Hoyne Ave., Chicago, Ill.
Vulcan Iron Works, Wilkes-Barre, Pa.
*WASHBURN & GRANGER (Inc.), 50 Church St., New York, N. Y...*p. 127*
Washington Iron Works, Seattle, Washington
*YALE & TOWNE MFG. CO., Stamford, Conn...*p. 405*

—Friction Drum
Brown Clutch Co., Sandusky, Ohio
*CALDWELL, H. W. & SON CO., 17th St. & Western Ave., Chicago, Ill...*p. 370*
Havana Mfg. Co., Havana, Ill.
*LIDGERWOOD MFG. CO., 96 Liberty St., New York, N. Y...*p. 388*
Milwaukee Shaper Co., 1029 Cold Spring Ave., Milwaukee, Wis.
Moffatt Machinery Mfg. Co., Charlotte, N. C.
MORRIS, HERBERT (Inc.), 1-15 Lawrence Place, Buffalo, N. Y...*p. 402*
Patten Mfg. Co., Chattanooga, Tenn.
POOLE ENGINEERING & MACHINE CO., Woodberry, Baltimore, Md...*pp. 316, 317*
*SHEPARD ELECTRIC CRANE & HOIST CO., Montour Falls, N. Y...*pp. 400, 401*
Wallace-Bird Pine Products (Inc.), 5 Beekman St., New York, N. Y.
Wellington Machine Co., Wellington, Ohio

—Gasoline
Byers, John F. Machine Co., Ravenna, Ohio
Domestic Engine & Pump Co., Shippenburg, Pa.
Gray Aldrich Co. (Inc.), 84 Atlantic Ave., Boston, Mass.
Ideal Engine Co., Lansing, Mich.
*LIDGERWOOD MFG. CO., 96 Liberty St., New York, N. Y...*p. 388*
*NOVO ENGINE CO., Lansing, Mich...*pp. 586, 587*
O. K. Clutch & Machinery Co., Columbia, Pa.
Patten Mfg. Co., Chattanooga, Tenn.
Universal Hoist & Mfg. Co., Cedar Falls, Ia.

—Hand Power
GILLIS & GEOGHEGAN, 543 W. Broadway, New York, N. Y...*p. 406*

—Head Gate
Coldwell, Wilcox Co., Newburgh, N. Y.
Dilts Machine Works (Inc.), Fulton, N. Y.
Holyoke Machine Co., Holyoke, Mass.
Hunt, Rodney Machine Co., Orange, Mass.
*LEFFEL, JAMES & CO., Springfield, Ohio...*p. 33*
Smith, S. Morgan Co., York, Pa.
Sturgis Machine Co., Sturgis, Mich.

—Kerosene
AMERICAN HOIST & DERRICK CO., St Paul, Minn...*p. 383*

—Mine
*ALLIS-CHALMERS MFG. CO., Milwaukee, Wis...*pp. 28, 29*
CONNELLSVILLE MFG. & MINE SUPPLY CO., Connellsville, Pa...*p. 384*
Hardie-Tynes Mfg. Co., 8th Ave. & 28th St., Birmingham, Ala.
*LIDGERWOOD MFG. CO., 96 Liberty St., New York, N. Y...*p. 388*
NEWHALL CHAIN FORGE & IRON CO., 90 West St., New York, N. Y...*p. 410*
NORDBERG MFG. CO., Milwaukee, Wis...*p. 11*
*NOVO ENGINE CO., Lansing, Mich...*pp. 586, 587*
OTTUMWA IRON WORKS (Inc.), Ottumwa, Iowa...*p. 385*
Stine, J. C. Co., Tyrone, Pa.
Washington Iron Works, Seattle, Washington
Western Machinery Co., 900 W. Main St., Los Angeles, Cal.

—Mono-Rail
Barber-Foster Engineering Co., 318 Stuyvesant Bldg., Cleveland, Ohio
Detroit Hoist & Machine Co., 8201 Morrow St., Detroit, Mich.
MARIS BROS. (Inc.), 5546 Grays Ave., Philadelphia, Pa...*p. 395*
MORRIS, HERBERT (Inc.), 1-15 Lawrence Place, Buffalo, N. Y...*p. 402*
*NORTHERN ENGINEERING WORKS, Detroit, Mich...*p. 397*
*SHEPARD ELECTRIC CRANE & HOIST CO., Montour Falls, N. Y...*pp. 400, 401*
TOLEDO CRANE CO., 102 Sandusky St., Bucyrus, Ohio...*p. 399*

—Outrigger
Mason, Volney W. & Co. (Inc.), 2 Lafayette St., Providence, R. I.
*SEDGWICK MACHINE WORKS, 146 W. 15th St., New York, N. Y...*p. 407*

—Skip
BARTLETT, C. O. & SNOW CO., Cleveland, Ohio...*p. 367*
*BEAUMONT, R. H. CO., 340 Arch St., Philadelphia, Pa...*pp. 368, 369*
CONNELLSVILLE MFG. & MINE SUPPLY CO., Connellsville, Pa...*p. 384*
HUNT, C. W. CO. (Inc.), West New Brighton, Staten Island, N. Y...*pp. 374, 375*
JEFFREY MFG. CO., 904 N. 4th St., Columbus, Ohio...*pp. 376, 377*
*LIDGERWOOD MFG. CO., 96 Liberty St., New York, N. Y...*p. 388*
NEWHALL CHAIN FORGE & IRON CO., 90 West St., New York, N. Y...*p. 410*
Otis Elevator Co., 11th Ave. & 26th St., New York, N. Y.

Digitized by Google

ROBINS CONVEYING BELT CO., Park Row Bldg., New York, N. Y...*p. 373*
Stephens-Adamson Mfg. Co., Aurora, Ill.

—Steam
(See Engines, Hoisting)

—Telescopic
GILLIS & GEOGHEGAN, 543 W. Broadway, New York, N. Y...*p. 406*
MORRIS, HERBERT (Inc.), 1-15 Lawrence Place, Buffalo, N. Y...*p. 402*

—Truck Body
Erie Hoist Co., 2101 Holland St., Erie, Pa.
McKenna Co., 1851 E. 38th St., Cleveland, O.
MORRIS, HERBERT (Inc.), 1-15 Lawrence Place, Buffalo, N. Y...*p. 402*

—Whip
Mason, Volney W. & Co. (Inc.), (''Mason's''), 2 Lafayette St., Providence, R. I.

HOLDERS

—Knurl
Graham Mfg. Co., Providence, R. I.
WILLIAMS, J. H. & CO., 70 Richards St., Brooklyn, N. Y...*p. 517*

—Nipple
Curtis & Curtis Co., 189 Garden St., Bridgeport, Conn.

—Tap and Die (Combination)
McCrosky Tool Corpn. (''McCrosky''), Meaville, Pa.
Procunier, William L., 14 So. Jefferson Ave., Chicago, Ill.

—Tool
AMERICAN TOOL & MACHINE CO., Boston 9, Mass...*p. 614*
Armstrong Bros. Tool Co., 333 N. Francisco Ave., Chicago, Ill.
CLEVELAND TWIST DRILL CO., Cleveland, Ohio...*p. 502*
National Machine Co., 135 Sheldon St., Hartford, Conn.
Ready Tool Co., Bridgeport, Conn.
Western Tool & Mfg. Co., Springfield, Ohio
WILLIAMS, J. H. & CO., 70 Richards St., Brooklyn, N. Y...*p. 517*

—Tool (For Slotting)
Moore, H. A. Co., 313 Norton St., Rochester, N. Y.

HOLLY GRAVITY RETURN SYSTEMS
(See Condensation Return Systems)

HONES
NORTON CO., Worcester, Mass...*pp. 489, 510*

HOOKS

—Annealing Box
*AMERICAN FORGE & MACHINE CO., Canton, Ohio...*pp. 430, 431*

—Crane
*AMERICAN FORGE & MACHINE CO., Canton, Ohio...*pp. 430, 431*
Keystone Drop Forge Works (''Keystone''), Chester, Pa.
MORRIS, HERBERT (Inc.), 1-15 Lawrence Place, Buffalo, N. Y...*p. 402*
NEWHALL CHAIN FORGE & IRON CO., 90 West St., New York...*p. 410*
Weimer Chain & Iron Co., Lebanon, Pa.
WILLIAMS, J. H. & CO., 70 Richards St., Brooklyn, N. Y...*p. 517*

HOPPERS

—Blast Furnace
Marshall Foundry Co, 1st Natl. Bank Bldg., Pittsburgh, Pa.

—Coal and Ash
CONNERY & CO. (Inc.), 2nd & Luzerne Sts., Philadelphia, Pa...*p. 651*
Green Engineering Co., East Chicago, Ind.
HONHORST, JOS. CO., 1016-20 W. 6th St., Cincinnati, Ohio...*p. 654*
*HUNT, C. W. CO. (Inc.), New Brighton, Staten Island, N. Y...*pp. 374, 375*
JEFFREY MFG. CO., 904 N. 4th St., Columbus, Ohio...*pp. 376, 377*
LASKER IRON WORKS, 3201 So. Lincoln St., Chicago, Ill...*p. 655*
NEW YORK CENTRAL IRON WORKS CO. (Inc.), North Midleburg Road, Hagerstown, Md...*p. 659*
WELLER MFG. CO., 1820-1856 N. Kostner Ave., Chicago, Ill...*p. 381*

—Weighing
BARTLETT, C. O. & SNOW CO., Cleveland, Ohio...*p. 367*
HOLMES, ROBT. & BROS. (Inc.), Danville, Ill...*pp. 386, 387*
HONHORST, JOS. CO., 1016-20 W. 6th St., Cincinnati, Ohio...*p. 654*
HUNT, C. W. CO. (Inc), West New Brighton, Staten Island, N. Y...*pp. 374, 375*
JEFFREY MFG. CO., 904 N. 4th St., Columbus, Ohio...*pp. 376, 377*
WELLER MFG. CO., 1820-1856 N. Kostner Ave., Chicago, Ill...*p. 381*

HOSE

—Acid
GOODRICH, B. F. RUBBER CO., Akron, O...*pp. 258, 259*

—Air
CHICAGO PNEUMATIC TOOL CO. (''Chicago Pneumatic''), 6 East 44th St., New York, N. Y...*p. 548*
GOODRICH, B. F. RUBBER CO., Akron, Ohio...*pp. 258, 259*
*INGERSOLL-RAND CO. (''Little David,'' ''Little Tugger''), 11 Broadway, New York, N. Y...*pp. 546, 547*
NEW YORK RUBBER CO., 34 Reade St., New York, N. Y...*pp. 260, 261*
Quaker City Rubber Co. (''Ebonite,'' ''Crown''), 629 Market St., Philadelphia, Pa.
WESTINGHOUSE TRACTION BRAKE CO., Wilmerding, Pa...*pp. 550, 551*

—Cotton, Rubber Lined
Empire Mfg. Co., 97 Spring St., Lockport, N. Y.
N. J. Car Spring & Rubber Co., Jersey City, N. J.

—Fire
GOODRICH, B. F. RUBBER CO., Akron, Ohio...*pp. 258, 259*
NEW YORK RUBBER CO., 34 Reade St., New York, N. Y...*pp. 260, 261*

—Gas
GOODRICH, B. F. RUBBER CO., Akron, Ohio...*pp. 258, 259*

—Gasoline
AMERICAN METAL HOSE CO., Waterbury, Conn...*p. 262*
GOODRICH, B. F. RUBBER CO., Akron, Ohio...*pp. 258, 259*

—Metal, Flexible
AMERICAN METAL HOSE CO., Waterbury, Conn...*p. 262*
Breeze Mfg. Co., 250 S. St., Newark, N. J.
''Double Service'' Packing Co., 246 Chestnut St, Philadelphia, Pa.
*JOHNS-MANVILLE, INC., New York, N. Y...*p. 244*
Kingsbridge Machine Works, Kingsbridge, New York, N. Y.
Mulconroy Co., Inc., Parkside Station, Philadelphia, Pa.
Penna. Flexible Metallic Tubing Co., N. E. Cor. Broad & Race Sts., Philadelphia, Pa.

Digitized by Google

United Metal Hose Co., Inc., 532 West 22nd St., New York, N. Y.
U. S. Flexible Metallic Tubing Co., 430 Boyd St., Los Angeles, Cal.

—Oil
AMERICAN METAL HOSE CO., Waterbury, Conn...*p. 262*
GOODRICH, B. F. RUBBER CO., Akron, Ohio...*pp. 258, 259*
United Metal Hose Co. (Inc.), 532 W. 22nd St., New York, N. Y.

—Rubber
Boston Belting Co., 84 Linden Park St., Boston, Mass.
Boston Woven Hose & Rubber Co., Cambridge, Mass.
Cincinnati Rubber Mfg. Co., Cincinnati, O.
Empire Rubber & Tire Co., Trenton, N. J.
FAIRBANKS-MORSE & CO., 900 S. Wabash Ave., Chicago, Ill...*p. 41*
GOODRICH, B. F. RUBBER CO., Akron, O. ..*pp. 258, 259*
Goodyear Tire & Rubber Co., Akron, Ohio
Gutta Percha & Rubber Mfg. Co, 126-128 Duane St., New York, N. Y.
*JOHNS-MANVILLE, INC., New York, N. Y...*p. 244*
Maguire Rubber Co., 200 Fifth Ave., New York, N. Y.
Manhattan Rubber Mfg. Co., 61 Willett St., Passaic, N. J.
Mercer Rubber Co., Hamilton Square, N. J.
New York Belting & Packing Co., 91-93 Chambers St., New York, N. Y.
NEW YORK RUBBER CO., 34 Reade St., New York, N. Y...*pp. 260, 261*
Pioneer Rubber Mills, 68 Sacramento St., San Francisco, Cal.
United States Rubber Co., 1790 Broadway, New York, N. Y.

—Steam
AMERICAN METAL HOSE CO., Waterbury, Conn...*p. 262*
Anchor Packing CO., 7th & Filbert Sts., Philadelphia, Pa.
Continental Rubber Works, 19th & Liberty Sts., Erie, Pa.
GOODRICH, B. F. RUBBER CO., Akron, Ohio...*pp. 258, 259*
*JOHNS-MANVILLE, INC., New York, N. Y...*p. 244*
NEW YORK RUBBER CO., 34 Reade St., New York, N. Y...*pp. 260, 261*
Quaker City Rubber Co. (''Ebonite''), 629 Market St., Philadelphia, Pa.

—Suction
Edson Mfg. Co., 377 Broadway, Boston, Mass.
FAIRBANKS, MORSE & CO., 900 S. Wabash Ave., Chicago, Ill...*p. 41*
GOODRICH, B. F. RUBBER CO., Akron, Ohio...*pp. 258, 259*
NEW YORK RUBBER CO., 34 Reade St., New York, N. Y...*pp. 260, 261*
United Metal Hose Co., Inc., 532 West 22nd St., New York, N. Y.

—Water
GOODRICH, B. F. RUBBER CO., Akron, Ohio...*pp. 258, 259*
NEW YORK RUBBER CO., 34 Reade St., New York, N. Y...*pp. 260, 261*

HOSE ATTACHMENTS (Couplings, Bands Holders, Clamps, Etc.)
CHICAGO PNEUMATIC TOOL CO. (''Chicago Universal''), 6 East 44th St., New York, N. Y...*p. 548*
Claflin, Chas. A. & Co., 161 High St., Boston, Mass.
*INGERSOLL-RAND CO., 11 Broadway, New York, N. Y...*pp. 546, 547*
Mulconroy Co. (Inc.), Parkside Station, Philadelphia, Pa.
WESTINGHOUSE TRACTION BRAKE CO., Wilmerding, Pa...*pp. 550, 551*

HOSE SAND-BLASTS
*PANGBORN CORPN., P. O. Box 859, Hagerstown, Md...*pp. 636, 637*

HUMIDIFIERS
*AMERICAN BLOWER CO., Detroit, Mich... *p. 553*
ATMOSPHERIC CONDITIONING CORPN., 435 Chestnut St., Philadelphia, Pa...*p. 617*
Bahnson Co., Winston-Salem, N. C.
Carrier Air Conditioning Co., Buffalo, N. Y.
*CARRIER ENGINEERING CORPN., 39 Cortlandt St., New York, N. Y...*p. 620*
KOVEN, L. O. & BRO., 154 Ogden Ave., Jersey City, N. J...*p. 605*
NEW YORK BLOWER CO. (''Peerless''), Chicago, Ill...*p. 555*
National Dry Kiln Co., 1118-1226 East Maryland St., Indianapolis, Ind.
Tillotson Humidifier Co., Providence, R. I.

HUMIDITY CONTROL
*AMERICAN BLOWER CO., Detroit, Mich... *p. 553*
ATMOSPHERIC CONDITIONING CORPN., 435 Chestnut St., Philadelphia, Pa...*p. 617*
Bahnson Co., Winston-Salem, N. C.
*CARRIER ENGINEERING CORPN., 39 Cortlandt St., New York, N. Y...*p. 620*
National Dry Kiln Co., 1118-1226 East Maryland St., Indianapolis, Ind.
Parks-Cramer Co., 970 Main St., Fitchburg, Mass.
Standard Regulator Co., 282 South St., Newark, N. J.
TAGLIABUE, C. J. MFG. CO., 18-88 33rd St., Brooklyn, N. Y...*p. 296*

HYDRANT HEADS, (Portable)
Ross Valve Mfg. Co., 4 Oakwood Ave., Troy, N. Y.

HYDRANTS, FIRE
Darling Valve & Mfg. Co., Williamsport, Pa.
Eddy Valve Co., Waterford, N. Y.
Kennedy Valve Mfg. Co., Elmira, N. Y.
Ludlow Valve Mfg. Co., Troy, N. Y.
Norwood Engineering Co., Florence, Mass.
Rensselaer Valve Co., Troy, N. Y.
Smith, A. P. Mfg. Co., East Orange, N. J.
WOOD, R. D. & CO. (''Mathews''), Philadelphia, Pa...*p. 597*

HYDRATING PLANTS
STEACY-SCHMIDT MFG. CO., York, Pa... *p. 618*

HYDRAULIC JACKS, RAMS, TURBINES, ETC.
(See Jacks, Rams, Turbines, etc., Hydraulic)

HYDRAULIC MACHINERY
*ALLIS-CHALMERS MFG. CO., Milwaukee, Wis...*pp. 28, 29*
BERTSCH & CO., Cambridge City, Ind... *p. 442*
Birmingham Iron Foundry, Derby, Conn.
BURROUGHS, CHARLES CO. (The), Newark, N. J...*p. 590*
ELLICOTT MACHINE CORPN., Baltimore, Md...*p. 588*
Exeter Machine Works, Inc., West Pittston, Pa.
FULTON IRON WORKS CO., St. Louis, Mo. ..*p. 37*
GALLAND-HENNING MFG. CO., Milwaukee, Wis...*p. 592*
General Briquetting Co., 25 Broad St., New York, N. Y.
Hennebohle, F. Co., 81st St. & S. Chicago Ave., So. Chicago, Ill.
Lake Erie Engineering Works, Buffalo, N. Y.
Logemann Bros. Co., 3120 Burleigh St., Milwaukee, Wis.

Digitized by Google

Lourie Mfg. Co., Springfield, Ill.
Mackintosh-Hemphill Co., 12th & Etna Sts., Pittsburgh, Pa.
METALWOOD MFG. CO., Detroit, Mich...*p. 594*
Morgan Engineering Co., Alliance, Ohio
NILES-BEMENT-POND CO., 111 Broadway, New York, N. Y...*p. 470*
OILGEAR CO., 60-62-64 27th St., Milwaukee, Wis...*p. 483*
Ridgway, Craig & Son Co., Coatesville, Pa.
ROBERTSON, JOHN & CO., 133 Water St Brooklyn, N. Y...*p. 595*
Southwark Foundry & Machine Co., 400 Washington Ave., Philadelphia, Pa.
*U. S. CAST IRON & FOUNDRY CO. Burlington, N. J...*pp. 232, 233*
WATSON-STILLMAN CO., 35 Church St., New York, N. Y...*p. 596*
WOOD, R. D. & CO., Philadelphia, Pa...*p. 597*
Wood, William H., Media, Pa.

HYDRAULIC PRESS CONTROL SYSTEM (Oil Pressure)
OILGEAR CO., 60-62-64 27th St., Milwaukee, Wis...*p. 483*

HYDRO-EXTRACTORS
AMERICAN TOOL & MACHINE CO. ("Weston"), Boston 9, Mass...*p. 614*

HYDRO-PNEUMATIC MACHINERY
METALWOOD MFG. CO., Detroit, Mich...*p. 594*

HYDROGEN GAS
Burdett Mfg. Co., 309 St. Johns Court, Chicoga, Ill.
Carbo-Hydrogen Co. of American, Benedum-Trees Bldg., Pittsburgh, Pa.
ELECTROLABS CO., Pittsburgh, Pa...*p. 536*
International Oxygen Co., 796 Frelinghuysen Ave., Newark, N. J.
Metals Welding Co., 4400 Perkins Ave Cleveland, Ohio
National Oxygen Co., 14 E. Harrison St., Chicago, Ill.

HYDROGEN TESTING APPARATUS
ELECTROLABS CO., Pittsburgh, Pa...*p. 536*

HYDROMETERS
Berg, James Mfg. Co., 3707 12th Ave., Brooklyn N. Y.
GRIEBEL INSTRUMENT CO., Carbondale Pa...*p. 300*
Palmer Co., 114-116 W. Sixth St., Cincinnati, Ohio
Philadelphia Thermometer Co., 54 N. 9th St Philadelphia, Pa.
Precision Thermometer & Instrument Co 1434 Brandywine St., Philadelphia, Pa.
TAGLIABUE, C. J. MFG. CO., 18-88 33rd St., Brooklyn N. Y...*p. 296*
Wagner, Carl H. 1944 W. Albany Ave., Chicago, Ill.
Weinhagen & Heape, 159-165 Leonard St New York, N. Y.

HYGROMETERS
BROWN INSTRUMENT CO. ("Brown") Philadelphia, Pa...*p. 292*
*FOXBORO CO. (Inc.), Foxboro, Mass...*p. 293*
Green, Henry J., 1191 Bedford Ave., Brooklyn, N. Y.
TAGLIABUE, C. J. MFG. CO., 18-88 33rd St., Brooklyn, N. Y...*p. 296*
Weinhagen & Heape, 159-165 Leonard St New York, N. Y.

I

I-BEAM TROLLEYS
(See Trolleys, Mono-Rail)

ICE HANDLING MACHINERY
*CALDWELL, H. W. & SON CO., 17th St. & Western Ave., Chicago, Ill...*p. 370*
*GIFFORD-WOOD CO., Hudson, N. Y...*p. 372*
JEFFREY MFG. CO., 904 N. 4th St., Columbus, Ohio...*pp. 376, 377*

ICE MAKING MACHINERY
American Carbonic Machinery Co., Wisconsin Rapids, Wis.
Arctic Ice Machine Co., Canton, Ohio
Armstrong Machinery Co., 3201-3219 E. Riverside, Spokane, Wash.
Baker Ice Machine Co., Omaha, Neb.
Ball Ice Machine Co., 3003 N. Broadway, St. Louis, Mo.
Brunswick Refrigerating Co., New Brunswick, N. J.
Buffalo Refrigerating Machine Co., 39 Lafayette St., New York, N. Y.
CARBONDALE MACHINE CO., Carbondale, Pa...*p. 630*
*CASEY HEDGES CO., Chattanooga, Tenn...*pp. 60, 61*
Castle Refrigerating Machine Co., Indianapolis, Ind.
Cincinnati Refrigerating Machinery Co., Lincoln Ave. & C. L. & N. R. R., Cincinnati, O.
Clothel Refrigerating Co., 61 Broadway, New York, N. Y.
Columbus Iron Works Co., Columbus, Ga.
*DE LA VERGNE MACHINE CO., 1123 E. 138th St., New York, N. Y...*p. 40*
Frick Co. (Inc.), Waynesboro, Pa.
Harris Ice Machine Works, 174 E. Water St., Portland, Ore.
*JOHNS-MANVILLE (Inc.), New York, N. Y...*p. 244*
KROESCHELL BROS. CO., 460 West Erie St., Chicago, Ill...*p. 75*
Mayer Ice Machine & Engineering Co., Westside and Grant Aves., Jersey City, N. J.
New Method Utilities Co., 45 Academy St., Newark, N. J.
Pennsylvania Engineering Co., 1119-21 N. Howard St., Philadelphia, Pa.
Phoenix Ice Machine Co., 2711 Church Ave., Cleveland Ohio
POOLE ENGRG. & MACHINE CO., Woodberry, Baltimore, Md...*pp. 316, 317*
Remington Machine Co., Wilmington, Del.
Roekler, H. B., 41 Maiden Lane, New York, N. Y.
Ruemmeli-Dawley Mfg. Co., Chouteau Ave., St. Louis, Mo.
Schantz, K. W., Inc., 78 Main St., Buffalo, N. Y.
Steam Appliance Co., 709 63rd St., West Allis, Wis.
Toledo Coldmaker Co., 1690 Fernwood Ave., Toledo, Ohio
Triumph Ice Machine Co. ("Triumph"). 3058 South St., Cincinnati, Ohio
United Iron Works, Inc., 301 Ridge Arcade Bldg., Kansas City, Mo.
*VILTER MFG. CO. 1194-1196 Clinton St., Milwaukee, Wis...*p. 16, 17*
*VOGT, HENRY MACHINE CO., Louisville Ky...*pp. 632, 633*
Vulcan Iron Works ("Vulcan"), 1849 Kearney St., San Francisco, Cal.
Wittenmeier Machinery Co., 852 N. Spaulding Ave., Chicago, Ill.
YORK MFG. CO., York, Pa...*p. 631*
—Automatic
AUTOMATIC CARBONIC MACHINE CO. Peoria, Ill...*p. 628*
AUTOMATIC REFRIGERATING CO., Hartford Conn...*p. 629*

ICE PLANT SUPPLIES
Arctic Ice Machine Co., Canton, Ohio
*DE LA VERGNE MACHINE CO., 1123 E. 138th St., New York, N. Y...*p. 40*

Digitized by Google

Ruemmeli-Dawley Mfg. Co., 3900 Chouteau Ave., St. Louis, Mo.
*VILTER MFG. CO., 1194-1196 Clinton St., Milwaukee, Wis. *pp. 16, 17*
*VOGT, HENRY MACHINE CO., Louisville, Ky...*pp. 632, 633*
YORK MFG. CO., York, Pa...*p. 631*

IDLERS, BELT
*FALLS CLUTCH & MACHINERY CO., Cuyahoga Falls, Ohio...*p. 330*
SMIDTH, F. L. & CO. ("Lenix"), 50 Church St., New York, N. Y...*p. 604*

IGNITION APPARATUS
Wells Mfg. Co., Fond du Lac, Wis.
*WESTINGHOUSE ELECTRIC & MFG. CO., East Pittsburgh, Pa...*pp. 160, 161*
Witherbee Igniter Co., 132 Liberty St., Springfield, Mass.

IMPREGNATING APPARATUS
DEVINE, J. P. CO., 1375 Clinton St., Buffalo, N. Y...*pp. 606, 607*

INCINERATORS
Harris Incinerators Steam Generator Co., 1212-1213 Independent Life Bldg., Nashville, Tenn.
Jarvis Engineering Co., 51 Ellery St., Boston, Mass.
NEW YORK CENTRAL IRON WORKS CO. (Inc.), North Middleburg Road, Hagerstown, Md...*p. 659*
*WASHBURN & GRANGER (Inc.), ("Dean"), 50 Church St., New York, N. Y...*p. 127*

INDICATOR POSTS (Valve)
*CRANE CO., 836 S. Michigan Ave., Chicago, Ill...*pp. 170, 171, 172, 173*
Darling Valve & Mfg. Co., Williamsport, Pa.
*PITTSBURGH VALVE, FOUNDRY & CONSTRUCTION CO., P. O. Box 1016, Pittsburgh, Pa...*pp. 192, 193*
*READING VALVE FITTINGS CO., (Pratt & Cady Div.), Hartford, Conn...*pp. 194, 195*
WOOD, R. D. & CO., Philadelphia, Pa... *p. 597*

INDICATORS

—Air Speed
*FOXBORO CO. (Inc.), Foxboro, Mass...*p. 293*

—CO. O_2, SO_2, H_2
MONO CORPN. OF AMERICA, 25 W. Broadway, New York, N. Y...*p. 283*

—CO_2
*BACHARACH INDUSTRIAL INSTRUMENT CO., Pittsburgh, Pa...*p. 279*
Crandon Mfg. Co., 105 Middle St., Portland, Me.
MONO CORPN. OF AMERICA, 25 W. Broadway, New York. N. Y...*p. 283*
*PRECISION INSTRUMENT CO., Newark, N. J...*pp. 284, 285*
*REPUBLIC FLOW METERS CO., 2240 Diversey Parkway, Chicago, Ill...*p. 281*
*UEHLING INSTRUMENT CO., 2011 Empire Bldg., New York, N. Y...*p. 286*

—Engine
AMERICAN STEAM GAUGE & VALVE MFG. CO. ("American Thompson"), Boston, Mass...*pp. 200, 201*
*BACHARACH INDUSTRIAL INSTRUMENT CO., Pittsburgh, Pa...*p. 279*
*CROSBY STEAM GAGE & VALVE CO., 40 Central St., Boston, Mass...*pp. 202, 208*
Robertson, Jas. L. & Sons ("Robertson Thompson") 78-80 Murray St., New York, N. Y.
Thompson, Richard & Co., 187 Greenwich St., New York, N. Y.
Trill Indicator Co., Center St., Corry, Pa.

—Engine (Continuous Card)
*BACHARACH INDUSTRIAL INSTRUMENT CO., Pittsburgh, Pa...*p. 279*
*CROSBY STEAM GAGE & VALVE CO., 40 Central St., Boston, Mass...*pp. 202, 208*
Trill Indicator Co., Center St., Cory, Pa.

—Engine (With Power Integrator)
*BACHARACH INDUSTRIAL INSTRUMENT CO., Pittsburgh, Pa...*p. 279*

—Flow (Gas)
Cory, Chas. E. & Son (Inc.), 183 Varick St., New York, N. Y.
Electro-Magnetic Tool Co., 2902 Carroll Ave., Chicago, Ill.
Hydrex Engineering Corpn., 73 West Eagle St., Buffalo, N. Y.
*REPUBLIC FLOW METERS CO., 2240 Diversey Parkway, Chicago, Ill...*p. 281*

—Flow (Oil)
*RICHARDSON-PHENIX CO., 126 Reservoir Ave., Milwaukee, Wis...*pp. 248, 249*

—Liquid Level
PNEUMERCATOR CO., 15 Park Row, New York, N. Y...*p. 297*
Steigert, L. Co., N. E. Cor. Eldert & Sogan Sts., Cincinnati, Ohio

—Smoke
Boiler Room Improvement Co. ("Eclipse"), 8 S. Dearborn St., Chicago, Ill.
Hamler Eddy Smoke Recorder Co., 3906 S. Halstead St., Chicago, Ill.

—Speed
ATKINS, E. C. & CO. (Inc.), Indianapolis, Ind...*p. 506*
*BACHARACH INDUSTRIAL INSTRUMENT CO., Pittsburgh, Pa...*p. 279*
BROWN INSTRUMENT CO. ("Brown"), Philadelphia, Pa...*p. 292*
ELECTRIC TACHOMETER CO., Philadelphia, Pa...*p. 299*
*FOXBORO CO. (Inc.), Foxboro, Mass...*p. 293*
*GREENE-TWEED & CO. ("Empire", "Weiss"), 109 Duane St., New York, N. Y...*p. 250*
Holz & Co. (Inc.), 17 Madison Ave., New York, N. Y.
*STARRETT, L. S. CO., Athol, Mass...*p. 508*
Veeder Mfg. Co., 20 Sargent St., Hartford, Conn.

INDUSTRIAL RAILWAYS
(See Railways, Industrial)

INGOT STRIPPERS
Price, T. W. Engineering Co., Woolworth Bldg., New York, N. Y.

INGOTS

—Brass
Michigan Smelting & Refining Co., Detroit, Mich.

—Steel
Erie Forge Co., Erie Forge & Steel Co., Erie, Pa.
Union Steel Casting Co., 62nd & Butler Sts., Pittsburgh, Pa.

INJECTORS
AMERICAN INJECTOR CO. ("U. S. Automatic"), Detroit, Mich...*p. 217*
Chemical Pump & Valve Co., 327 Gifford St., Perth Amboy, N. J.
*CRANE CO., 836 S. Michigan Ave., Chicago, Ill...*pp. 170, 171, 172, 173*
Desmond-Stephan Mfg. Co., Urbana, Ohio
Edna Brass Mfg. Co., 525-33 Reading Rd., Cincinnati, Ohio
Eynon-Evans Corpn., 15th & Clearfield Sts., Philadelphia, Pa.
Godfrey, Keeler Co., 70 Warren St., New York, N. Y.

Digitized by Google

*JENKINS BROS., 80 White St., New York, N. Y...*pp. 180, 181*
*LUNKENHEIMER CO., Cincinnati, Ohio...*pp. 184, 185, 186, 187, 188, 189*
Manning, Maxwell & Moore (Inc.), 119 W. 40th St., New York, N. Y.
Nathan Mfg. Co., 21 East Fortieth St., New York, N. Y.
Ohio Injector Co., S. Main St., Wadsworth, Ohio.
Penberthy Injector Co., 1242 Holden Ave., Detroit, Mich.
Randle Machinery Co. ("Leader") Cincinnati, Ohio
Rue Mfg. Co., 228 Cherry St., Philadelphia, Pa.
*SCHUTTE & KOERTING CO. ("Universal"), 1184 Thompson St., Philadelphia, Pa...*p. 159*
Sellers, Wm. & Co. (Inc.), Philadelphia, Pa.
Sherwood Mfg. Co., 1702-1712 Elmwood Ave., Buffalo, N. Y.
Watson, N. A., 2016 State St., Erie, Pa.

INSTALLATIONS (Steam and Electric)
Wendland, C. F. Engineering & Construction Co., 63 Wooster St., New York, N. Y.

INSTRUMENTS

—Acoustical
Standard Scientific Co., Cor. W. 4th & Barrow Sts., New York, N. Y.

—Drawing
Aloe, A. S. Co., 513 Olive St., St. Louis, Mo.
Defiance Mfg. Co., 22 E. 41st St, New York, N. Y.
Dietzgen, Eugene Co., Chicago, Ill.
Keuffel & Esser Co., Hoboken, N. J.
Kolesch & Co., 138 Fulton St., New York, N. Y.
Ledder & Probst (Inc.), 21 Pearl St., Boston, Mass.
New York Blue Print Paper Co., 102 Reade St., New York, N. Y.
PEASE, C. F. CO., 843 N. Franklin St., Chicago, Ill...*p. 664*
Soltmann, E. G. (Inc.), 202 E. 42nd St., New York, N. Y.
United States Blue Print Paper Co. ("Richler"), 201-207 S. Wabash Ave., Chicago, Ill.
Universal Drafting Mach. Co., Cleveland, O.
Weber, F. Co., 1220 Buttonwood St., Philadelphia, Pa.
Weil, J. H. & Co., 1300 Arch St., Philadelphia, Pa.

—Dry Kiln
National Dry Kiln Co., 1118-1226 East Maryland St., Indianapolis, Ind.

—Electric Measuring
BIDDLE, JAMES G. ("Frahm, Jagabi"), 1211-1213 Arch St., Philadelphia, Pa...*p 298*
BROWN INSTRUMENT CO. ("Brown"), Philadelphia, Pa...*p. 292*
Esterline-Angus Co., Indianapolis, Ind.
*GENERAL ELECTRIC CO., Schenectady, N Y...*pp. 18, 19, 20, 21*
Hickok Electrical Instrument Co., 10514 Dupont Ave., Cleveland, Ohio
Jewell Electrical Instrument Co., 1650 Walnut St., Chicago, Ill.
Leeds & Northrup Co., 4901 Stenton Ave., Philadelphia, Pa.
Morse Thermo-Gage Co (Inc.), 111 Eddy St., Ithaca, N. Y.
Pignolet, Louis M., 78 Cortlandt St., New York, N. Y.
Price Electric Co., 12369 Euclid Ave., Cleveland, Ohio
Detroit Electric Co, 434 Shelby St., Detroit, Mich.
Thompson-Levering Co., 325 Arch St., Philadelphia, Pa.
*WESTINGHOUSE ELECTRIC & MFG. CO., East Pittsburgh, Pa...*pp. 160, 161*
Weston Electrical Instrument Co., Waverly Park, Newark, N. J.

—Hardness Measuring
Central Scientific Co., 460 E. Ohio St., Chicago, Ill.
Holz & Co. (Inc.), 17 Madison Ave., New York, N. Y.
OLSEN, TINIUS TESTING MACHINE CO. ("Brinnell"), 500 N. 12th St., Philadelphia, Pa...*pp. 265, 266, 267*
Pittsburgh Instrument & Machine Co., 40 Water St., Pittsburgh, Pa.
Scientific Materials Co., 709-719 Forbes St., Pittsburgh, Pa.
Shore Instrument & Mfg. Co., 9025-9029 Van Wyck Ave., Jamaica, N. Y.

—Metal Testing
Holz & Co. (Inc.), 17 Madison Ave., New York, N. Y.

—Precision Measuring
Central Scientific Co., 460 E. Ohio St., Chicago, Ill.
Coats Machine Tool Co. (Inc.), 30 Church St., New York, N. Y.
*NORMA CO. OF AMERICA, Anable Ave., Long Island City, N. Y...*p. 351*
Pyroletric Instrument Co., 636-640 East State St., Trenton, N. J.
*STARRETT, L. S. CO., Anthol, Mass...*p. 508*

—Recording
AMERICAN STEAM GAUGE & VALVE MFG. CO., Boston, Mass...*pp. 200, 201*
*ASHTON VALVE CO., 161 First St., Cambridge, Boston, Mass...*p. 287*
*BACHARACH INDUSTRIAL INSTRUMENTAL CO., Pittsburgh Pa...*p. 279*
*BAILEY METER CO. ("Bailey"), 2009 East 46th St., Cleveland, Ohio..*p. 280*
*BRISTOL CO., Waterbury, Conn...*p. 291*
BROWN INSTRUMENT CO. ("Brown"), Philadelphia, Pa...*p. 292*
*BUILDERS IRON FOUNDRY, Providence, R. I...*p. 277*
*CROSBY STEAM GAGE & VALVE CO., 40 Central St., Boston, Mass...*pp. 202, 208*
DUVIVIER, ERNEST H., 30 Church St., New York, N. Y...*p. 270*
*FOXBORO CO. (Inc.), Foxboro, Mass...*p. 293*
HAYS, JOS. W. CORP'N, Michigan City, Ind...*p. 282*
Hydro Mfg. Co., 320 Bullitt Bldg., Philadelphia, Pa.
MONO CORP'N OF AMERICA, 25 W. Broadway, New York, N. Y...*p. 283*
*PRECISION INSTRUMENT CO., Newark, N. J...*pp. 284, 285*
*REPUBLIC FLOW METERS CO., 2240 Diversey Parkway, Chicago, Ill...*p. 281*
*SCHAEFFER & BUDENBERG MFG. CO., Brooklyn, N. Y...*p. 295*
TAGLIABUE, C. J. MFG. CO., 18-88 33rd St., Brooklyn, N. Y...*p. 296*
Taylor Instrument Cos. ("Tycos"), Rochester, N. Y.
Thwing Instrument Co., 3339 Lancaster Ave., Philadelphia, Pa.
*UEHLING INSTRUMENT CO., 2011 Empire Bldg., New York, N. Y...*p. 286*
*WESTINGHOUSE ELECTRIC & MFG. CO., East Pittsburgh, Pa...*pp. 160, 161*
Wilson-Maeulen Co., 781 E. 142nd St., New York, N. Y.

In

Digitized by Google

—Scientific
BIDDLE, JAMES G., 1211-1213 Arch St., Philadelphia, Pa...*p. 295*
BROWN INSTRUMENT CO. (''Brown''), Philadelphia, Pa...*p. 292*
Central Scientific Co., 460 E. Ohio St., Chicago, Ill.
Custer Specialty Co., 119-121 Franklin St., Dayton, Ohio
Makepeace, B. L. (Inc.), 387 Washington St., Boston, Mass.
Palmer Co., 114-116 W. Sixth St., Cincinnati, Ohio
PEASE, C. F. CO., 843 N. Franklin St., Chicago, Ill...*p. 664*
Queen-Gray Co., 616-620 Chestnut St., Philadelphia, Pa.
Sperry Gyroscope Co., Manhattan Bridge Plaza, Brooklyn, N. Y.
Standard Scientific Co., Cor. W. 4th & Barrow Sts., New York, N. Y.
Williams, Brown & Earle (Inc.), 918 Chestnut St., Philadelphia, Pa.

—Surveying
Ainsworth, William & Sons, 2151 Lawrence St., Denver, Colo.
Aloe, A. S. Co., 513 Olive St., St. Louis, Mo.
Keuffel & Esser Co., Hoboken, N. J.
Ledder & Probst (Inc.), 21 Pearl St., Boston, Mass.
PEASE, C. F. CO., 843 N. Franklin St., Chicago. Ill...*p. 664*
Post, Frederick Co., 3635 N. Hamlin Ave., Chicago, Ill.
Williams, Brown & Earle (Inc.), 918 Chestnut St., Philadelphia, Pa.

—Toughness and Endurance Testing
OLSEN, TINIUS TESTING MACHINE CO. (''Upton-Lewis''), 500 North 12th St., Philadelphia, Pa...*pp. 265, 266, 267*

INSULATING MACHINERY
AMERICAN INSULATING MACHINERY CO., Philadelphia, Pa...*p. 638*
NEW ENGLAND BUTT CO., Providence, R. I...*p. 639*
NEW ENGLAND WIRE MACHINERY CO., New Haven, Conn...*p. 640*
ROYLE, JOHN & SONS, Paterson, N. J...*p. 643*
TEXTILE MACHINE WORKS, Reading, Pa. *p. 644*
TORRINGTON MFG. CO., Torrington, Conn. *p. 641*

INSULATING MATERIALS

—Cold
Armstrong Cork & Insulation Co., 122 24th St. Pittsburgh, Pa.
Banner Rock Products Co. (''Rock Cork''), Alexandria, Ind.
Booth Felt Co. (Inc.), 440-450 14th St., Brooklyn, N. Y.
Insulating Products Co., 1601 Fulford St., Kalamazoo. Mich.
Union Fibre Co., Winona, Minn.
United States Mineral Wool Co., 280 Madison Ave., New York, N. Y.

—Electric
American Hard Rubber Co., 11 Mercer St., New York, N. Y.
AMERICAN VULCANIZED FIBRE CO., Wilmington, Del...*p. 417*
*CONTINENTAL FIBRE CO., Newark, Del. *p. 418*
DIAMOND STATE FIBRE CO,. Bridgeport, Pa...*p. 420*
Fibroc Insulation Co., Valparaiso, Ind.
General Bakelite Co., 2 Rector St., New York, N. Y.
*GENERAL ELECTRIC CO., Schenectady, N. Y...*pp. 18, 19, 20, 21*
*JOHNS-MANVILLE, INCORPORATED, New York, N. Y...*p. 244*
Johns-Pratt Co., 555 Capitol Ave., Hartford, Conn.
Sterling Varnish Co., 528 Fulton Bldg., Pittsburgh, Pa.
United States Asbestos Co., Fehl Bldg., Lancaster, Pa.
*WESTINGHOUSE ELECTRIC & MFG. CO., East Pittsburgh, Pa...*pp. 160, 161*

—Heat
Acme Asbestos Covering & Supply Co., 1302 Fulton St., Chicago, Ill.
Banner Rock Products Co. (''Rock Wool''), Alexandria, Ind.
*CELITE PRODUCTS CO., 11 Broadway, New York, N. Y...*p. 135*
EHRET MAGNESIA MFG. CO., Valley Forge, Pa...*p. 245*
Fibre Cell Asbestos Mfg. Co., 407-409 S. Clinton St., Chicago, Ill.
Insulating Products Co., 1601 Fulford St., Kalamazoo. Mich.
*JOHNS-MANVILLE, INC., New York, N. Y...*p. 244*
KEASBY & MATTISON CO., Ambler, Pa. *p. 245*
*KING REFRACTORIES CO. (Inc.), (''Flame Brand''), 1709 Niagara St., Buffalo, N. Y...*p. 137*
*MAGNESIA ASSOCIATION OF AMERICA, Bulletin Bldg., Philadelphia, Pa...*p. 245*
National Asbestos Mfg. Co., 163-193 Henderson St., Jersey City, N. J.
Nightingale & Childs Co., 205 Congress St., Boston, Mass.
Norristown Magnesia & Asbestos Co., Norristown, Pa.
*QUIGLEY FURNACE SPECIALTIES CO. (''Insulbrix,'' ''Insulblox,'' ''Insuline''), 26 Cortlandt St., New York, N. Y...*pp. 129, 138, 139*
Richards Mfg. Co., Grand Rapids, Mich
Ric-Wil Co., 522 Guardian Bldg., Cleveland, Ohio
Standard Asbestos Mfg. Co., Chicago, Ill.

IRON

—Bar
Interstate Iron & Steel Co., 104 S. Michigan Ave., Chicago, Ill.
Lockhart Iron & Steel Co., Pittsburgh, Pa.
Pittsburgh Forge & Iron Co., 1003 Penn Ave., Pittsburgh, Pa.
Reading Iron Co., Reading, Pa.

—Charcoal
Federal Tool & Alloy Steel Corp'n, 62-76 Rutledge St., Brooklyn, N. Y.

—Pig
Central Iron & Steel Co., Front & Dock Sts., Harrisburgh, Pa.

—Staybolt
Falls Hollow Staybolt Co., 21 E. Portage St., Cuyahoga Falls, Ohio
Lockhart Iron & Steel Co., Pittsburgh, Pa.
Rome Iron Mills (Inc.), 14 East 42nd St., New York, N. Y.
Sligo Iron & Steel Co., Connellsville, Pa.

—Staybolt, Hollow
Falls Hollow Staybolt Co., 21 E. Portage St., Cuyahoga Falls, Ohio

IRON WORK, ORNAMENTAL
(See Ornamental Work)

IRRIGATION MACHINERY
Castle, A. M. Engineering Co. (Inc.), La-Crosse, Wis.
*SPRAY ENGINEERING CO., 60 High St., Boston, Mass...*pp. 166, 167*

Digitized by Google

J

JACKS—

—Car
DeWeese, F. M. Co. (''Mosher''), Chillicothe, Ohio

—Hydraulic
Dudgeon, Richard, Broome & Columbia Sts., New York, N. Y.
ELMES, CHAS. F. ENGINEERING WORKS, 215 N. Morgan St., Chicago, Ill...*p. 591*
Henderer's, A. L. Sons, Wilmington, Del.
Joyce-Gridland Co., Dayton, Ohio
Justice, Philip S. & Co. (''Reliance''), 421 Chestnut St., Philadelphia, Pa.
WATSON-STILLMAN CO., 35 Church St., New York, N. Y...*p. 596*
Wood, R. D. & CO., Philadelphia, Pa...*p. 597*

—Lifting
Buda Co., 606 Railway Bldg., Chicago, Ill.
DeWeese, F. M. Co. (''Mosher''), Chillicothe, Ohio
Duff Mfg. Co., Box 555, N. S., Pittsburgh, Pa.
Iron City Products Co. (''Rees''), Pittsburgh, Pa.
Joyce-Gridland Co., Dayton, Ohio
McKiernan-Terry Drill Co., 15 Park Row, New York, N. Y.
MORRIS, HERBERT (Inc.), 1-15 Lawrence Place, Buffalo, N. Y...*p. 402*

—Pumping
FAIRBANKS, MORSE & CO., 900 S. Wabash Ave., Chicago, Ill...*p. 41*
NATIONAL SUPPLY CO., Toledo, Ohio..*pp. 648, 649*

—Pumping (Oil Well)
Myrick Machine Co., Olean, N. Y.
NATIONAL SUPPLY CO., Toledo, Ohio...*pp. 648, 649*

—Screw
Clayville Foundry & Machine Co. (Inc.), Clayville, N. Y.
Joyce Cridland Co., Dayton, Ohio
Justice, Philip S. & Co., 421 Chestnut St., Philadelphia, Pa.

—Track
DeWeese, F. M. Co. (''Mosher''), Chillicothe, Ohio

JACQUARD-CARD MACHINES
ROYLE, JOHN & SONS, Paterson, N. J...*p. 643*

JAWS, FACE PLATE (Portable)
Horton, E. & Son Co., Windsor Locks, Conn.

JIGS (Drilling)
Automatic Drill Tool Co. (''Adjusto''), 549 W. Washington Blvd., Chicago, Ill.

JIGS AND FIXTURES
Bath, John & Co., 8 Grafton St., Worcester, Mass.
Bradley Machine Co., Bridgeport, Conn.
Bultman, F. H. Co., 10271 Berea Road, Cleveland, Ohio
City Engineering Co., 35 S. St. Clair St., Dayton, Ohio
City Machine & Tool Works, 3rd & June Sts., Dayton, Ohio
Columbus Die, Tool & Machine Co., 955 Cleveland Ave., Columbus, Ohio
Davie Tool Co., 1662 E. 118th St.,. Cleveand, Ohio
Diamant Tool & Mfg. Co. (Inc.), 91-97 Runyon St., Newark, N. J.
Dodge Tool Co., Grinnell, Iowa
DOVE-SMITH & SON, Niagara Falls, N. Y. ..*p. 492*
Easton Machine Co., Washington St., South Easton, Mass.
Franklin Die Tool Co., Beck & Park Sts., Columbus, Ohio
Gardam, Wm. & Son (Inc.), 114 Park Place, New York, N. Y.
Geier Co., 5102 St. Clair Ave., Cleveland, Ohio
Gem City Machine Co.,. 434 E. First St., Dayton, Ohio
Goddard Tool Co., 351 W. Chicago Ave., Chicago, Ill.
Hartford Engine Works, 223 State St., Hartford, Conn.
Hinsman Machine & Tool Co., Elm St., Westfield, Mass.
Holmes Mfg. Co., Shelton, Conn.
Johnson & Biddle Tool Co., 312-14 N. Main St., Elkhart, Ind.
McCall Machine Works, 573 Lytell Ave., Rochester, N. Y.
Mantle & Co., 1907 Park Ave., New York, N. Y.
Marvin, W. B. Mfg. Co.,. Urbama, Ohio
Maute, J. Sons Die & Tool Works, 21-23 Kane St., Buffalo, N. Y.
Mehl Machine Tool & Die Co. (''Mehl Made''), Roselle, N. J.
Modern Mfg. Co., 75 Third St., Bridgeport, Conn.
Modern Tool & Machine Works (Inc.), 344-350 Mulberry St., Newark, N. J.
Peterson, A. H. Mfg. Co., Milwaukee, Wis.
Production Tool & Engrg. Co., 507 W. Jackson Blvd., Chicago, Ill.
Quick Change Chuck Mfg. Co., 818 E. Monument Ave., Dayton, Ohio
Robbins, Gamwell & Co., 68 West St., Pittsfield, Mass.
Security Tool Works, 115 S. Clinton St., Chicago, Ill.
Sheffield Machine & Tool Co., Dayton, Ohio
Titan Automatic Tool Co., 25 W. Broadway, New York, N. Y.
Ulmer, J. C. Co., 1791 E. 38th St., Cleveland, Ohio
Union Gear & Machine Co., 27 Purchase St., Boston, Mass.
Urbana Tool and Die Co., Urbana, Ohio

JOINTS

—Ball and Swing
*BARCO MFG. CO., Chicago, Ill...*p. 240*
Morgan Flexible Steam Joint Co. (Inc.), 217 West Main St., Louisville, Ky.
Peninsular Milled Screw Co., 1090 Lafayette East, Detroit, Mich.

—Expansion
AMERICAN DISTRICT STEAM CO. (''Adsco''), North Tonawanda, N. Y...*p. 242*
*BADGER, E. B. & SONS CO., 75 Pitts St., Boston, Mass...*p. 164*
*BRAUN, C. F. & CO., San Francisco, Cal. *pp. 156, 157*
*CRANE CO., 836 S. Michigan Ave., Chicago, Ill...*pp. 170, 171, 172, 173*
Croll-Reynolds Co. (Inc.), 95 Liberty St., New York, N. Y.
Direct Separator Co., Syracuse, N. Y.
Harris, Arthur & Co., 212 Curtis St., Chicago, Ill.
Hercules Float Works, 200 Franklin St., Springfield, Mass.
Hornung, J. C., 843 S. Dearborn St., Chicago, Ill.
KELLY & JONES CO., Greensburg, Pa...*pp. 182, 183*
Konold, M. J. Co., 602 Bessemer Bldg., Pittsburgh, Pa.
*LUNKENHEIMER CO., Cincinnati, Ohio ..*pp. 184, 185, 186, 187, 188, 189*
NELSON VALVE CO., Chestnut Hill, Philadelphia, Pa...*p. 190*

Jo

Digitized by Google

*PITTSBURGH VALVE, FOUNDRY & CONSTRUCTION CO., P. O. Box 1016, Pittsburgh, Pa...*pp. 192, 193*
Ross Heater & Mfg. Co. (Inc.), 1407 West Ave., Buffalo, N. Y.
Sloan, A. H. Co. (Inc.), 410 Moffat Bldg., Detroit, Mich.
Tyler Underground Heating System, 815 S. Canal St., N. S., Pittsburgh, Pa.
*U. S. CAST IRON PIPE & FOUNDRY CO., Burlington, N. J...*pp. 232, 233*
WEBSTER, WARREN & CO., Camden, N. J. *pp. 154, 155*
*WHEELER, C. H. MFG. CO., Sedgley & Lehigh Ave., Philadelphia, Pa...*p. 163*

—Flexible
*BARCO MFG. CO., Chicago, Ill...*p. 240*
Berry Flexible Pipe Joint Co., 845 Barrow St., New Orleans, La.
Morgan Flexible Steam Joint Co., 217 West Main St., Louisville, Ky.
*U. S. CAST IRON PIPE & FOUNDRY CO., Burlington, N. J...*pp. 232, 233*
Walker Mfg. Co., Fenton, Mich.

—Pipe (Ball)
*BARCO MFG. CO., Chicago, Ill...*p. 240*

—Pipe (Flanged)
Ballwood Co., 30 Church St., New York, N. Y.
*CRANE CO., 836 S. Michigan Ave., Chicago, Ill...*pp. 170, 171, 172, 173*
Mitchell, W. K. & Co. (Inc.), 2940 Ellsworth St., Philadelphia, Pa.
*PITTSBURGH VALVE, FOUNDRY & CONSTRUCTION CO., P. O. Box 1016. Pittsburgh, Pa...*pp. 192, 193*
Power Piping Co., Beaver & Western Ave., Pittsburgh, Pa.
SIMMONS PIPE BENDING WORKS, 40 Mechanic St., Newark, N. J...*p. 235*
*U. S. CAST IRON PIPE & FOUNDRY CO., Burlington, N. J...*pp. 232, 233*

—Swing and Swivel
*BARCO MFG. CO., Chicago, Ill...*p. 240*
Bordo, L. J. CO., 12th & Thompson Sts., Philadelphia, Pa.
*PITTSBURGH VALVE, FOUNDRY & CONSTRUCTION CO., P. O. Box 1016, Pittsburgh, Pa...*pp. 192, 193*
Williams, Franklin (Inc.), ("Tuxedo"), 39 Cortlandt St., New York, N. Y.

—Universal
Burtt Mfg. Co., Kalamazoo, Mich.
Cooper Flexible Transmission Co. (Inc.), 18th St. & 8th Ave., Brooklyn, N. Y.
Easton Machine Co., South Easton, Mass.
Gray and Prior Machine Co., 98 Suffield St., Hartford, Conn.
Spicer Mfg. Corp'n, South Plainfield, N. J.
Universal Machine Co., Bowling Green, Ohio

JOLT RAMMING MACHINES
(See Rammers, Foundry)

JOURNAL BOXES
*ALLIS-CHALMERS MFG. CO., Milwaukee, Wis...*pp. 28, 29*
*CALDWELL, W. E. CO., 340 E. Brandeis St., Louisville, Ky...*p. 323*
JEFFREY MFG. CO., Columbus, Ohio...*pp. 376, 377*
National Malleable Castings Co., 7706 Platt Ave., Cleveland, Ohio
Syniington, T. H. Co. ("Syniington"), 233 Broadway, New York, N. Y.
WELLER MFG. CO., 1820-1856 N. Kostner Ave., Chicago, Ill...*p. 381*

K

KEROSENE
TIDE WATER OIL CO., 11 Broadway, New York, N. Y...*pp. 252, 253*

KETTLES

—Agitating
CONNERY & CO. (Inc.), 2nd and Luzerne Sts., Philadelphia, Pa...*p. 651*
*U. S. CAST IRON PIPE & FOUNDRY CO., Burlington, N. J...*pp. 232, 233*

—Chemical
DEVINE, J. P. CO., 1375 Clinton St., Buffalo, N. Y...*pp. 606, 607*
*FULLER-LEHIGH CO., Fullerton, Pa...*p. 128*
Gray and Prior Machine Co., 98 Suffield St., Hartford, Conn.
LASKER IRON WORKS, 3201 So. Lincoln St., Chicago, Ill...*p. 655*

—Galvanizing
LASKER IRON WORKS, 3201 So. Lincoln St., Chicago, Ill...*p. 655*

—Grease
LASKER IRON WORKS, 3201 So. Lincoln St., Chicago, Ill...*p. 655*

—Steam-Jacketed
Aluminum Company of America, Pittsburgh, Pa
*BADGER, E. B. & SONS CO., 75 Pitts St., Boston, Mass...*p. 164*
Buckeye Boiler Co., 1617 McLain St., Dayton, Ohio
*CASEY-HEDGES CO., Chattanooga, Tenn. *pp. 60, 61*
*COLE, R. D. MFG. CO., Newnan, Ga...*p. 62*
CONNERY & CO. (Inc.), 2nd and Luzerne Sts., Philadelphia, Pa...*p. 651*
DEVINE, J. P. CO., 1375 Clinton St., Buffalo, N. Y...*pp. 606, 607*
Harris, Arthur & Co., 212 Curtis St., Chicago, Ill.
LASKER IRON WORKS, 3201 So. Lincoln St., Chicago, Ill...*p. 655*
KOVEN, L. O. & BROTHER, 154 Ogden Ave., Jersey City, N. J...*p. 605*
MURRAY IRON WORKS CO., Burlington, Iowa...*pp. 80, 81*
Sowers Mfg. Co., 1300 Niagara St., Buffalo, N. Y.
*TITUSVILLE IRON WORKS CO., Titusville, Pa...*p. 89*
*U. S. CAST IRON PIPE & FOUNDRY CO., Burlington, N. J...*pp. 232, 233*

—Tar
CONNERY & CO. (Inc.), 2nd & Luzerne Sts., Philadelphia, Pa...*p. 651*
Estate F. H. Evans, 31-35 Hewes St., Brooklyn, N. Y.
HONHORST, JOS. CO., 1016-20 W. 6th St., Cincinnati, Ohio...*p. 654*
KOVEN, L. O. & BROTHER, 154 Ogden Ave., Jersey City, N. J...*p. 605*
LASKER IRON WORKS, 3201 So. Lincoln St., Chicago, Ill...*p. 655*

—Varnish
CONNERY & CO. (Inc.), 2nd and Luzerne Sts., Philadelphia, Pa...*p. 651*
Harris, Arthur & Co., 212 Curtis St., Chicago, Ill.
HONHORST, JOS. CO., 1016-20 W. 6th St., Cincinnati, Ohio...*p. 654*
KOVEN, L. O. & BROTHER, 154 Ogden Ave., Jersey City, N. J...*p. 605*

KEYS, MACHINE
Columbia Nut & Bolt Co. (Inc.), ("Simplicity"), Bridgeport, Conn.
Dyett, Frank J. Co., 73 John St., Ilion, N. Y.
Leard, Wm. Co., 16th St. & 5th Ave, New York, N. Y.
Moltrup Steel Products Co., Beaver Falls, Pa.
Standard Gauge Steel Co., Beaver Falls, Pa.

Digitized by Google

*WHITNEY MFG. CO. (''Whitney''), Hartford, Conn...*p. 495*
WILLIAMS, J. H. & CO., 70 Richards St., Brooklyn, N. Y...*p. 517*

KEYSEATING MACHINES
Baker Brothers, Post & Westlake St., Toledo, Ohio
Chattanooga Machinery Co. (''Catlin''), N. Chattanooga, Tenn.
Davis, C. F. Machine Co. (Inc.), 133 Andrews St., Rochester, N. Y.
Davis Machine Tool Co. (Inc.), 305 St. Paul St., Rochester, N. Y.
Lapointe, J. N. Co., New London, Conn.
Lapointe Machine Tool Co., Hudson, Mass.
Mitts & Merrill, 816 S. Franklin St., Saginaw, Mich.
Pawtucket Mfg. Co., 327 Pine St., Pawtucket, R. I.
VELCO MFG. CO. (Inc.), Greenfield, Mass...*p. 461*
*WHITNEY MFG. CO. (''Whitney''), Hartford, Conn...*p. 495*

KIERS (Bleach)
BIGGS BOILER WORKS CO., Case Ave. & Newton St., Akron, Ohio..*p. 650*
KOVEN, L. O. & BROTHER, 154 Ogden Ave., Jersey City, N. J...*p. 605*
LASKER IRON WORKS, 3201 So. Lincoln St., Chicago, Ill...*p. 655*
LEBANON BOILER WORKS (J. K. Petty & Co., Inc.), 6 So. 15th St., Philadelphia, Pa...*pp. 78, 79*
NEWBURGH STEAM BOILER WORKS, (P. Delany & Co.), Newburgh, N. Y...*p. 64*
SMITH, SAMUEL & SON CO., Paterson, N. J...*p. 88*

KILNS
—Cement
*ALLIS-CHALMERS MFG. CO., Milwaukee, Wis...*pp. 28, 29*
BONNET CO., Canton, Ohio..*p. 598*
*CRESCENT REFRACTORIES CO., Curwensville, Clearfield County, Pa...*p. 136*
*FULLER-LEHIGH CO., Fullerton, Pa. *p. 128*
LASKER IRON WORKS, 3201 So. Lincoln St., Chicago, Ill...*p. 655*
RUGGLES-COLES ENGINEERING CORP'N, 120 Broadway, New York, N. Y...*p. 609*

—Dry (Brick, Lumber, Stone, etc.)
Adkins, Young & Aleen Co., 561 W. Washington Blvd., Chicago, Ill.
*AMERICAN BLOWER CO., Detroit, Mich. *p. 553*
Curtis Hosey Dryer Co. (''Thermo-Myst''), 2220 Chestnut St., Philadelphia, Pa.
Emerson Dry Kiln Co. (Inc.), Flatiron Bldg., New York, N. Y.
Grand Rapids Vapor Kiln, Grand Rapids, Mich.
National Dry Kiln Co., 1118-1226 East Maryland St., Indianapolis, Ind.
NEW YORK BLOWER CO., Chicago, Ill...*p. 555*
NEW YORK CENTRAL IRON WORKS CO. (Inc.), North Middleburg Road, Hagerstown, Md...*p. 659*
STURTEVANT, B. F. CO., Hyde Park, Boston, Mass...*p. 106*

—Lime
*CASEY-HEDGES CO., Chattanooga, Tenn. *pp. 60, 61*
*CRESCENT REFRACTORIES CO., Curwensville, Clearfield County, Pa...*p. 136*
*FULLER-LEHIGH CO., Fullerton, Pa...*p. 128*
Glamorgan Pipe & Foundry Co., Lynchburg, Va.
LASKER IRON WORKS, 3201 So. Lincoln St.,. Chicago, Ill...*p. 655*
NEW YORK CENTRAL IRON WORKS CO. (Inc.), North Middleburg Road, Hagerstown, Md...*p. 659*
RUGGLES-COLES ENGINEERING CORP'N, 120 Broadway, New York, N. Y...*p. 609*
STEACY-SCHMIDT MFG. CO. (''Eldred''), York, Pa...*p. 612*

KNIVES
—Belt
ATKINS, E. C. & CO. (Inc.), Indianapolis, Ind...*p. 506*

—Circular
Huther Bros. Saw Mfg. Co., 1190 University Ave., Rochester, N. Y.
Hyde Mfg. Co., Southbridge, Mass.

—Cutting (Cloth, Leather, etc.)
Hyde Mfg. Co., Southbridge, Mass.

—Machine
ATKINS, E. C. & CO. (Inc.), Indianapolis, Ind...*p. 506*
Dilts Machine Works (Inc.), Fulton, N. Y.
*SIMONDS MFG. CO., Fitchburg, Mass...*p. 507*

—Shear
Heppenstall Forge & Knife Co., 4620 Hatfield St., Pittsburgh, Pa.
Tinker, F. & Sons Co., Butler St. at 57th Arsenal Sta., Pittsburgh, Pa.

—Squaring Shear
NIAGARA MACHINE & TOOL WORKS, Buffalo, N. Y...*p. 443*

L

LABELING MACHINES
Economic Machine Co., Worcester, Mass.
Ermold, Edward Co., 652 Hudson St., New York, N. Y.

LABORATORY APPARATUS
Bario-Metal Corpn., 167 W. 18th St., New York, N. Y.
BROWN INSTRUMENT CO. (''Brown''), Philadelphia, Pa...*p. 292*
Eimer & Amend, 205 Third Ave., New York, N. Y.
*GENERAL ELECTRIC CO., Schenectady, N. Y...*pp. 18, 19, 20, 21*
GRIEBEL INSTRUMENT CO., Carbondale, Pa...*p. 300*
Scientific Materials Co., 709-710 Forbes St., Pittsburgh, Pa.
Standard Calorimeter Co., East Moline, Ill.
Standard Scientific Co., Cor. W. 4th & Barrow Sts., New York, N. Y.
STURTEVANT MILL CO., Harrison Sq., Boston 22, Mass...*pp. 600, 601*

LABORATORY WARE
Corning Glass Works, Corning, N. Y.
Day, J. H. Co., 1144 Harrison Ave., Cincinnati, Ohio
GRIEBEL INSTRUMENT CO., Carbondale, Pa...*p. 300*
Hanovia Chemical & Mfg. Co., Chestnut St. & N. J. R. R. Ave., Newark, N. J
NORTON CO, Worcester, Mass...*pp. 489, 510*
*PRECISION INSTRUMENT CO., Newark, N. J...*pp. 284, 285*

LACE LEATHER
Central Belting Co., 151 Lafayette St., New York, N. Y.
Consolidated Belting Co., 2 Jeffrey St., Chester, Pa.
Cook, H. N. Belting Co., 401 Howard St., San Francisco, Cal.

Digitized by Google

Coupe, Wm. Co. (Ltd.), ("Excelsior"), South Attleboro, Mass.
Couse & Bolten, 42 Lafayette St., Newark, N. J.
Druid Oak Belting Co. (Inc.), 111 E. Lombard St., Baltimore, Md.
Etsweiler, William Co. ("Diamond"), 230 N. 3rd St., Philadelphia, Pa.
Holyoke Belting Co., 66-68 Winter St., Holyoke, Mass.
Hudson Belting Co., Worcester, Mass.
Jewell Belting Co., Hartford, Conn.
Johnson Belting Co., 342 E. 38th St., New York, N. Y.
McCauley Belting Co., 412-420 Orleans St., Chicago, Ill.
New York Leather Belting Co., 428-30 Broadway, New York, N. Y.
Norwich Belting Co., Norwich, Conn.
Olmsted-Flint Co., Cambridge, Mass.
Rhoads, J. E. & Sons ("Tannate"), 12 N. Thrid St., Philadelphia, Pa.
SCHIEREN, CHAS. A. CO., 30-38 Ferry St., New York, N. Y...*pp. 362, 363*
Schwartz Belting Co., 76 Murray St., New York, N. Y.
Walker's, Chas. W. Sons & Co., 288 Market St., Newark, N. J.
Warren Belting Co., 33 Arctic St., Worcester, Mass.

LADLES
Arcade Mfg. Co., Freeport, Ill.
Central Foundry Supply Co., P. O. Box 495, Columbus, Ohio
LEBANON BOILER WORKS (J. K. Petty & Co., Inc.), 6 So. 15th St., Philadelphia, Pa...*pp. 78, 79*
NEW YORK CENTRAL IRON WORKS CO. (Inc.), North Middleburg Road, Hagerstown, Md...*p. 659*
Price, T. W. Engineering Co., Woolworth Bldg., New York, N. Y.
Treadwell Construction Co., Midland, Pa.

LAMP BRACKETS
Newman Mfg. Co., 719 Sycamore St., Cincinnati, Ohio

LAMP GUARDS, ELECTRIC
FLEXIBLE STEEL LACING CO. ("Flexco," "Flexco-Lok"), 4638 Lexington Street, Chicago, Ill...*p. 364*
Hubbell, Harvey (Inc.), State St. & Bostwick Ave., Bridgeport, Conn.

LAMP MAKING MACHINERY (Incandescent)
AMERICAN GAS FURNACE CO., Elizabeth, N. J...*p. 527*
York Electric & Machine Co., 30-34 N. Penn St., York, Pa.

LAMP SOCKETS
Hubbell, Harvey (Inc.), State St. & Bostwick Ave., Bridgeport, Conn.

LAMPS
—Arc
*GENERAL ELECTRIC CO., Schenectady, N. Y...*pp. 18, 19, 20, 21*
Wagenhorst, J. H. & Co., 512 Andrews Ave., Youngstown, Ohio

—Acetylene
Carbic Mfg. Co., Duluth, Minn.

—Incandescent
*GENERAL ELECTRIC CO., Schenectady, N. Y...*pp. 18, 19, 20, 21*
*WESTINGHOUSE ELECTRIC & MFG. CO., East Pittsburgh, Pa...*pp. 160, 161*

—Mine (Electric)
Edison Storage Battery Co., Orange, N. J.
*WESTINGHOUSE ELECTRIC & MFG. CO., East Pittsburgh, Pa...*pp. 160, 161*

—Mine (Safety)
Witherbee Ignitor Co., 132 Liberty St., Springfield, Mass.

LAPPING MACHINES
Oliver Instrument Co., Adrian, Mich.

LATHE ATTACHMENTS
Curtis & Curtis Co., 189 Garden St., Bridgeport, Conn.
Fay & Scott, Dexter, Me.
LeBlond, R. K. Machine Tool Co., Cincinnati, Ohio
Newman Mfg. Co., 717 Sycamore St., Cincinnati, Ohio
Stark Tool Co., 218 Moody St., Waltham, Mass.
Wade-American Tool Co., 311 Atlantic Ave., Boston, Mass.

LATHE DOGS
AUTOMATIC PRODUCTS CORPN., 199-203 Eighth St., Long Island City, N. Y...*p. 518*
WILLIAMS, J. H. & CO., 70 Richards St, Brooklyn, N. Y...*p. 517*

LATHES
—Automatic
CLEVELAND AUTOMATIC MACHINE CO., Cleveland, Ohio..*p. 462*
*JONES & LAMSON MACHINE CO. ("Fay Flanders", "Hartness"), Springfield, Vt...*pp. 450, 451, 452, 453, 454*
McCabe, J. J., 149 Broadway, New York, N. Y.

—Automatic Staff
Davenport Machine Tool Co. (Inc.), Rochester, N. Y.

—Axle
Bridgeford Machine Tool Works, Winton Rd., Rochester, N. Y.
Fitchburg Machine Works ("Lo-Swing"), Fitchburg, Mass.
NILES-BEMENT-POND CO., 111 Broadway, New York, N. Y...*p. 470*

—Bench
Ames, B. C. Co., Waltham, Mass.
Dalton Manufacturing Corp'n, Sound Beach, Conn.
Flather Mfg. Co., Nashua, N. H.
Hardinge Bros. (Inc.), 1770 Beatean Ave., Chicago, Ill.
Oliver, W. W. Mfg. Co., 1483 Niagara St., Buffalo, N. Y.
PORTER-CABLE MACHINE CO., Syracuse, N. Y...*p. 460*
PRATT & WHITNEY CO., 111 Broadway, New York, N. Y...*p. 471*
Rivett Lathe & Grinder Co., Brighton District of Boston, Boston, Mass.
Shepard Lathe Co., Rising Sun, Ind.
Sloan & Chace Mfg. Co. (Ltd.), 6th Ave. & N. 18th St., Newark, N. J.
Stark Tool Co., 218 Moody St., Waltham, Mass.
Wade-American Tool Co., 311 Atlantic Ave., Boston, Mass.
Worcester Lathe Co., 68 Prescott St., Worcester, Mass.

—Bevel Gear Turning
Bridgeford Machine Tool Works, Winton Rd., Rochester, Mass.
*JONES & LAMSON MACHINE CO., Springfield, Vt...*pp. 450, 451, 452, 453, 454*

—Bobbin
Murkland, J. W. Co., Barton, Vt.

—Brass
NILES-BEMENT-POND CO., 111 Broadway, New York, N. Y...*p. 470*
*WARNER & SWASEY CO., Cleveland, Ohio ..*pp. 456, 457*

Digitized by Google

WOOD TURRET MACHINE CO., Brazil, Ind. *pp. 458, 459*

—Brass Finishers'
AMERICAN TOOL & MACHINE CO. ("Fox"), Boston, 9, Mass...*p. 614*

—Brass Forming
Acme Machine Tool Co., 4955 Spring Grove Ave., Cincinnati, Ohio
Meriden Machine Tool Co. ("Meriden"), Meriden, Conn.
MILLHOLLAND MACHINE CO., Indianapolis, Ind...*p. 455*

—Burring
Meriden Press & Drop Co., 153 State St., Meriden, Conn.
United States Electrical Tool Co., 2490 W. 6th St., Cincinnati, Ohio

—Chucking
Cincinnati Lathe & Tool Co., 3207-3211 North St., Oakley, Cincinnati, Ohio
Greaves-Klusman Tool Co., Cor. Cook & Alfred Sts., Cincinnati, Ohio
INTERNATIONAL MACHINE TOOL CO. ("Libby"), 1124 W. 21st St. & Belt Railway..*pp. 448, 449*
*JONES & LAMSON MACHINE CO., Springfield, Vt...*pp. 450, 451, 452, 453, 454*
Lodge & Shipley Machine Tool Co., Cincinnati, Ohio.
NILES-BEMENT-POND CO., 111 Broadway, New York, N. Y...*p. 470*
WOOD TURRET MACHINE CO. ("Tilted Turret"), Brazil, Ind...*pp. 458, 459*

—Chucking Automatic
*JONES & LAMSON MACHINE CO. ("Hartness"), Springfield, Vt...*pp. 450, 451, 452, 453, 454*

—Chucking (Semi-Automatic)
CLEVELAND AUTOMATIC MACHINE CO., Cleveland, Ohio..*p. 462*
*JONES & LAMSON MACHINE CO., Springfield, Vt...*pp. 450, 451, 452, 453, 454*

—Crankshaft
Fitchburg Machine Works ("Lo-Swing"). Fitchburg, Mass.
NILES-BEMENT-POND CO., 111 Broadway, New York, N. Y...*p. 470*

—Double End
Greenlee Bros. & Co., Rockford, Ill.

—Engine
American Tool Works Co., Pearl & Eggleston Ave., Cincinnati, Ohio
Axelson Machine Co., P. O. Box 316, Los Angeles, Cal.
Bay State Iron Works, Erie, Pa.
Bradford Machine Tool Co., 657 Evans St., Cincinnati, Ohio
Bridgeford Machine Tool Works, Winton Rd., Rochester, N. Y.
Carroll-Jamieson Machine Tool Co., Batavia, Ohio
Champion Tool Works Co., 4955 Spring Grove Ave., Cincinnati Ohio
Cincinnati Lathe & Tool Co., 3208-3211 North St., Oakley, Cincinnati, Ohio
Cisco Machine Tool Co., Elmore & Ch. & D. Ry., Cincinnati Ohio
Crawford Machine Tool Co. (Inc.), 21 Park Row, New York, N. Y.
Davis, C. F. Machine Co. (Inc., 133 Andrews St., Rochester, N. Y.
Davis Machine Tool Co. (Inc.), 305 St. Paul St., Rochester, N. Y.
Fay & Scott, Dexter, Me.
Fulton Machine Tool Co., 1422 W. Randolph St., Chicago, Ill.
Greaves-Klusman Tool Co., Cor. Cook & Alfred Sts., Cincinnati, Ohio
HERCULES MACHINE & TOOL CO. (Inc.), Broome & Lafayette Sts., New York, N. Y. *p. 476*
Houston, Stanwood & Gamble Co., Cincinnati, Ohio
Johnson, I. H. Jr. Co., 337 N. 15th St., Philadelphia Pa.
Lehmann Machine Co., 606-612 S. Broadway, St. Louis, Mo.
Lodge & Shipley Machine Tool Co., Cincinnati, Ohio
Mann, Chas. A., 166 Doyle Ave., Providence, R. I.
Monarch Machine Tool Co., Sidney, Ohio
Morris Machine Tool Co., Cincinnati, Ohio
Mueller Machine Tool Co., 2425 Colerain Ave., Cincinnati, Ohio
Myers Machine Tool Corp'n, 2nd & Chestnut Sts., Columbia, Pa.
National Lathe Co., 15 W. 2nd St., Cincinnati, Ohio
NILES-BEMENT-POND CO., 111 Broadway, New York, N. Y...*p. 470*
Oliver Machinery Co., Grand Rapids, Mich.
Osborne & Sexton Machinery Co., Columbus, Ohio
Pittsburgh Machine Tool Co., Braddock, Pa.
PORTER-CABLE MACHINE CO., Syracuse, N. Y...*p. 460*
PRATT & WHITNEY CO., 111 Broadway, New York, N. Y...*p. 471*
Rahn-Larmon Co., 2941 Spring Grove Ave., Cincinnati, Ohio
Reed-Prentice Co., Worcester, Mass.
Rockford Lathe & Drill Co., 1827 14th Ave., Rockford, Ill.
San Francisco Engineering Co., 322-324 6th St., San Francisco, Cal.
Sebastian Lathe Co., Cincinnati, Ohio
Seneca Falls Mfg. Co., 314-340 Fall St., Seneca Falls, N. Y.
Sidney Machine Tool Co., Sidney, Ohio
South Bend Lathe Works, South Bend, Ind.
Springfield Machine Tool Co., Springfield, Ohio
Standard Lathe Works, Cincinnati, Ohio
Superior Machine Tool Co., Kokomo, Ind.
Walcott Lathe Co., Jackson, Mich.
Westlund, Carl G. Co., 498 Millbury St., Worcester, Mass.
Whitcomb-Blaisdell Machine Tool Co., Worcester, Mass.
Wickes Bros., Saginaw, Mich.
Willard Machine Tool Co., Cincinnati, Ohio
Worcester Lathe Co., 68 Prescott St., Worcester, Mass.

—Foot Power
Dalton Mfg. Corp'n, Sound Beach, Conn.
Mann, Chas. A., 166 Doyle Ave., Providence, R. I.
South Bend Lathe Works, South Bend, Ind.

—Gap
Barnes Drill Co. (Inc.), 814-830 Chestnut St., Rockford, Ill.
Harrington, Edwin Son & Co. (Inc.), S. E. Cor 17th & Callowhill Sts., Philadelphia, Pa.
NILES-BEMENT-POND CO., 111 Broadway, New York, N. Y...*p. 470*
Rahn-Larmon Co., 2941 Spring Grove Ave., Cincinnati, Ohio

—Geared Head
Lehmann Machine Co., 606-612 S. Broadway, St. Louis, Mo.

—Gun
Gilman & Son, Springfield, Vermont
HERCULES MACHINE & TOOL CO. (Inc.), Broome & Lafayette Sts., New York, N. Y. *p. 476*
NILES-BEMENT-POND CO., 111 Broadway, New York, N. Y...*p. 470*

La

Digitized by Google

LATHES (Continued)

—Heavy Duty

Davis, D. F., Machine Co. (Inc.), 133 Andrews St., Rochester, N. Y.
HERCULES MACHINE & TOOL CO. (Inc.), Broome & Lafayette Sts., New York, N. Y. *p. 476*
INTERNATIONAL MACHINE TOOL CO. (''Libby''), 1124 W. 21st St. & Belt Railway, Indianapolis, Ind...*pp. 448, 449*
LeBlond, R. K. Machine Tool Co., Cincinnati, Ohio
National Lathe Co., 15 W. 2nd St., Cincinnati, Ohio
NILES-BEMENT-POND CO., 111 Broadway, New York, N. Y...*p. 470*
Pittsburgh Machine Tool Co., Braddock, Pa.

—Metal-Spinning

Meriden Machine Tool Co. (''Yankee''), Meriden, Conn.
Pryibil, P. Machine Co., 520 W. 41st St., New York, N. Y.

—Pattern Makers'

Fay & Scott, Dexter, Me.

—Polishing

Meriden Press & Drop Co., 153 State St., Meriden, Conn.

—Precision

Elgin Tool Works, Elgin, Ill.
Hardinge Bros. (Inc.), 1770 Bertean Ave., Chicago Ill.
PORTER-CABLE MACHINE CO., Syracuse, N. Y...*p. 460*
Potter, S. A. Tool & Machine Works, 79 E. 130th St., New York, N. Y.
PRATT & WHITNEY CO., 111 Broadway, New York, N. Y...*p. 471*
Seneca Falls Mfg. Co. (Inc.), Seneca Falls, N. Y.
Wade-American Tool Co., 311 Atlantic Ave., Boston, Mass.

—Projectile

Cleveland Crane & Engineering Co., Wickliffe, Ohio
HERCULES MACHINE & TOOL CO. (Inc.), Broome & Lafayette Sts., New York, N. Y. *p. 476*
NILES-BEMENT-POND CO., 111 Broadway, New York, N. Y...*p. 470*

—Pulley

Cincinnati Pulley Machinery Co., Cincinnati, Ohio
*JONES & LAMSON MACHINE CO., Springfield, Vt...*pp. 450, 451, 452, 453, 454*
NILES-BEMENT-POND CO., 111 Broadway, New York, N. Y...*p. 470*

—Roll

Youngstown Foundry & Machine Co., Youngstown, Ohio

—Screw-Cutting

Automatic Machine Co., Bridgeport, Conn.
Cincinnati Lathe & Tool Co., 3207-3211 North St., Oakley, Cincinnati Ohio
Cisco Machine Tool Co., Elmore & Ch. & D. Ry., Cincinnati, Ohio
Dalton Mfg. Corp'n, Sound Beach, Conn.
Driggs Ordnance & Mfg. Co. (''New Haven''), 140 Broadway, New York, N. Y.
Greaves-Klusman Tool Co., Cor. Cook & Alfred Sts., Cincinnati, Ohio
HERCULES MACHINE & TOOL CO (Inc.), Broome & Lafayette Sts., New York, N. Y. *p. 476*
Lehmann Machine Co., 606-612 S. Broadway, St. Louis, Mo.
NILES-BEMENT-POND CO., 111 Broadway, New York, N. Y...*p. 470*
PORTER-CABLE MACHINE CO., Syracuse, N. Y...*p. 460*
Shepard Lathe Co., Rising Sun., Ind.
South Bend Lathe Works, South Bend, Ind.
Worcester Lathe Co., 68 Prescott St., Worcester, Mass.

—Shafting

Fitchburg Machine Works (''Lo-Swing''), Fitchburg, Mass.

—Speed

Mann, Chas. A., 166 Doyle Ave., Providence, R. I.
NILES-BEMENT-POND CO., 111 Broadway, New York, N. Y...*p. 470*
PORTER-CABLE MACHINE CO., Syracuse, N. Y...*p. 460*

—Tool Room

Bradford Machine Tool Co., 657 Evans St., Cincinnati, Ohio
Buckeye Drill & Lathe Co., Marion Rd., Columbus, Ohio
Champion Tool Works Co., 4955 Spring Grove Ave., Cincinnati, Ohio
Cisco Machine Tool Co., Cincinnati, Ohio
Crawford Machine Tool Co. (Inc.), 21 Park Row, New York, N. Y.
Lodge & Shipley Machine Tool Co., Cincinnati, Ohio
National Lathe Co., 15 W. 2nd St., Cincinnati, Ohio
PORTER-CABLE MACHINE CO., Syracuse, N. Y...*p. 460*
Rahn-Larmon Co., 2941 Spring Grove Ave., Cincinnati, Ohio
Rockford Tool Co., Rockford, Ill.
Seneca Falls Mfg. Co. (Inc.), Seneca Falls, N. Y.
Walcott Lathe Co., Jackson, Mich.

—Turret

Acme Machine Tool Co., 4955 Spring Grove Ave., Cincinnati, Ohio
Adams, O. R. Mfg. Co. (Inc.), 300 Norton St., Rochester, N. Y.
American Machine Tool Engrg. Wks., 4854 W. Kinzie St., Chicago, Ill.
AMERICAN TOOL & MACHINE CO. (''Fox''), Boston, 9, Mass...*p. 614*
Bardons & Oliver, 1133 Ninth St., Cleveland, Ohio
Bradford Machine Tool Co., 657 Evans St., Cincinnati, Ohio
Cincinnati Lathe & Tool Co., 3207-3211 North St., Oakley, Cincinnati, Ohio
Dreses Machine Tool Co., 227 W. McMicken Ave., Cincinnati, Ohio
Foster Machine Co., W. Beardsley Ave., Elkhart, Ind.
Gisholt Machine Co., Madison, Wis.
Greenlee Bros. & Co., Rockford, Ill.
HERCULES MACHINE & TOOL CO. (Inc.), Broome & Lafayette Sts., New York, N. Y. *p. 476*
Hollingworth Machine Tool Co., 2nd & Greenup Sts., Covington, Ky.
INTERNATIONAL MACHINE TOOL CO. (''Libby''), 1124 W. 21st St. & Belt Railway, Indianapolis, Ind...*pp. 448, 449*
*JONES & LAMSON MACHINE CO. (''Hartness''), Springfield, Vt...*pp. 450, 451, 452, 453, 454*
MILLHOLLAND MACHINE CO., Indianapolis, Ind...*p. 455*
Monarch Machine Tool Co., Sidney, Ohio
NATIONAL ACME CO. (''Gridley''), Cleveland, Ohio...*pp. 464, 465*
Potter & Johnston Machine Co., Pawtucket, R. I.
PRATT & WHITNEY CO., 111 Broadway, New York, N. Y. *p. 471*
Rahn-Larmon Co., 2941 Spring Grove Ave., Cincinnati, Ohio
Ryerson, Joseph T. & Son, 16th & Rockwell Sts., Chicago, Ill.
Smurr & Kamen Co., 328 N. Albany Ave., Chicago, Ill.

Digitized by Google

STEINLE TURRET MACHINE CO., Madison, Wis...*p. 447*
*WARNER & SWASEY CO., Cleveland, Ohio *pp. 456, 457*
WOOD TURRET MACHINE CO. (''Tilted Turret''), Brazil, Ind...*pp. 458, 459*
York Electric & Machine Co., 30-34 N. Penn St., York, Pa.

—Turret (Semi-Automatic)
WOOD TURRET MACHINE CO. (''Tilted Turret''), Brazil, Ind...*pp. 458, 459*

—Turret (Vertical)
King Machine Tool Co., Winton Place Station Cincinnati, Ohio
NILES-BEMENT-POND CO., 111 Broadway, New York, N. Y...*p. 470*

—Wheel
NILES-BEMENT-POND CO., 111 Broadway, New York, N. Y...*p. 470*
Bullard Machine Tool Co., Bridgeport, Conn.

—Wood Turning
Gilman & Son, Springfield, Vt.
Partridge, E. O., 2047-2049 W. Lake St., Chicago, Ill.
Whitney, Baxter D. & Son (Inc.), Winchendon, Mass.

LEAD

—Pig
Marx, A. & Sons, 1645 Tchoupitoulas St., New Orleans, La.
United States Smelting Co. (Inc.), 120 Broadway, New York, N. Y.

—Sheet
United Lead Co., 111 Broadway, New York, N. Y.

LEAD BURNERS
Chemical Pump & Valve Co., 327 Gifford St., Perth Amboy, N. J.
MILBURN, ALEXANDER CO. (The), Baltimore, Md...*p. 540*
NEWBURGH STEAM BOILER WORKS (P. Delany & Co.), Newburgh, N. Y...*p. 64*
SMITH'S INVENTIONS (Inc.), 2636 4th St., S. E., Minneapolis, Minn. *p. 541*

—Electric
*GENERAL ELECTRIC CO. (''Pyrotip''), Schenectady, N. Y...*pp. 18, 19, 20, 21*

LEAD PIPE MACHINERY
ROBERTSON, JOHN, & CO., 133 Water St., Brooklyn, N. Y...*p. 595*
WATSON-STILLMAN CO., 35 Church St., New York, N. Y...*p. 596*

LEAD TRAP MACHINERY
ROBERTSON, JOHN, & CO., 133 Water St., Brooklyn, N. Y...*p. 595*

LEATHER BELTING, PACKING, ETC.
(See Belting, Packing, etc., Leather)

LEATHER GOODS, MECHANICAL
Alexander Bros., 414 N. 3rd St., Philadelphia, Pa.
Chicago Rawhide Mfg. Co., 1301 Elston Ave., Chicago, Ill.
New York Leather Belting Co., 428-30 Broadway, Brooklyn, N. Y.
Palmer, N. & Co., Bridgeport, Conn.
SCHIEREN, CHAS. A. CO., 30-38 Ferry St., New York, N. Y...*pp. 362, 363*
Shultz Belting Co., St. Louis, Mo.
Union Belt Co., 66 Troy St., Fall River, Mass.
Warren Belting Co., 33 Arctic St., Worcester, Mass.

LEATHER SKIVING MACHINES
Fortuna Machine Co., 127 Duane St., New York, N. Y.

LEATHER SPLITTING MACHINES
AMERICAN TOOL & MACHINE CO., Boston 9, Mass...*p. 614*

LEATHER-WORKING MACHINERY
Slocomb, F. F. & Co. (Inc.), Wilmington, Del.
Spencer Regulator Co., Cor. Derby & Liberty Sts., Salem, Mass.

LEATHERS

—Friction
American Oak Leather Co., Cincinnati, Ohio
SCHIEREN, CHAS. A. CO., 30-38 Ferry St., New York, N. Y...*pp. 362, 363*

—Hydraulic
American Oak Leather Co., Cincinnati, Ohio
BURROUGHS, CHARLES CO., Newark, N. J...*p. 590*
Consolidated Belting Co., 2 Jeffrey St., Chester, Pa.
Eastern Machinery & Equipment Co. (Inc.), 1036 Commercial Trust Bldg., Philadelphia, Pa.
Ireson, Charles L., 221 High St., Boston, Mass.
Page Belting Co., Concord, N. H.
Preston, Horace G. Co. (''Wear Well''), 90 Beecher Ave., Detroit, Mich.
SCHIEREN, CHAS. A. CO., 30-38 Ferry St., New York, N. Y...*pp. 362, 363*
Walkers, Chas. W. Sons & Co., 288 Market St., Newark, N. J.

—Polishing
SCHIEREN, CHAS. A. CO., 30-38 Ferry St., New York, N. Y...*pp. 362, 363*

—Pump
American Oak Leather Co., Cincinnati, O.
Norwich Belting Co., Norwich, Conn.
SCHIEREN, CHAS. A. CO., 30-38 Ferry St., New York, N. Y...*pp. 362, 363*

—Textile
SCHIEREN, CHAS. A. CO., 30-38 Ferry St., New York, N. Y...*pp. 362, 363*

LEVERS, FLEXIBLE (Wire)
*GWILLIAM CO. (''Bowden''), 23 Flatbush Ave., Brooklyn, N. Y...*pp. 356, 357, 358*

LIFTS
(See Hoists, Elevators, etc.)

LIGHTING PLANTS

—Electric
Aerothrust Engine Co., La Porte, Mo.
*ALLIS-CHALMERS MFG. CO., Milwaukee, Wis...*pp. 28, 29*
Consolidated Utilities Corpn. (''Matthews''), 730 S. Michigan St., Chicago, Ill.
Frost Engineering Co., Evansville, Wis.
Fuller & Johnson Mfg. Co., 1350 E. Washington Ave., Madison, Wis.
Granger, A. D. Co. (''Universal''), 15 Park Row, New York, N. Y.
Langstadt Meyer Co., Appleton, Wis.
Lauson-Lawton Co., De Pere, Wis.
Lazier Gas Engine Co., Buffalo, N. Y.
Pyle-National Co., 1334 N. Kostner St., Chicago, Ill.
Regal Gasoline Engine Co., Coldwater, Mich.
Rochester Motors Co. (Inc.), Rochester, N. Y.
*WESTINGHOUSE ELECTRIC & MFG. CO., East Pittsburgh, Pa...*pp. 160, 161*

—Railroad Car (Electric)
Electric Storage Battery Co., Allegheny Ave. & 19th St., Philadelphia, Pa.
Safety Car Heating & Lighting Co., New Haven, Conn.
U. S. Light & Heat Corpn. (''USL''), Niagara Falls, N. Y.

LIGHTNING-ARRESTERS
*GENERAL ELECTRIC CO., Schenectady, N. Y...*pp. 18, 19, 20, 21*
*JOHNS-MANVILLE (Inc.), New York, N. Y...*p. 244*
*WESTINGHOUSE ELECTRIC & MFG. CO., East Pittsburgh, Pa...*pp. 160, 161*

Li

Digitized by Google

LIGHTS, CARBIDE (Portable)
MILBURN, ALEXANDER CO., Baltimore, Md...*p. 540*

LINERS (Pump and Press)
SANDUSKY FOUNDRY & MACHINE CO., Sandusky, Ohio..*p. 646*

LININGS

—Blast Furnace
*CRESCENT REFRACTORIES CO., Curwensville, Clearfield County, Pa...*p. 136*

—Brake
Advance Packing & Supply Co., 11 N. Franklin St., Chicago, Ill.
Asbestos and Rubber Works of America (Inc.), 1821 Broadway, New York, N. Y.
Cork Insert Co., 164 Federal St., Boston, Mass.
DIAMOND STATE FIBRE CO., Bridgeport, Pa...*p. 420*
Federal Asbestos Co., 149 Hamburg Ave., Paterson, N. J.
General Asbestos & Rubber & Co. (''Garco''), Charleston, S. Car.
*JOHNS-MANVILLE, (Inc.), (''Non-Burn''), New York, N. Y...*p. 244*
Mikesell Brothers Co. (''Superbestos''), 156 N. La Salle St., Chicago, Ill.
Russell Mfg. Co. (''Rusco''), Middletown, Conn.
Specialty Engineering Co., Allegheny & Trenton Aves., Philadelphia, Pa.
United States Asbestos Co., Fehl Bldg., Lancaster, Pa.

—Clutch
DIAMOND STATE FIBRE CO., Bridgeport, Pa...*p. 420*

—Flue
*CRESCENT REFRACTORIES CO., Curwensville, Clearfield County, Pa...*p. 136*

—Forge Furnace
*CRESCENT REFRACTORIES CO., Curwensville, Clearfield County, Pa. *p. 136*

—Furnace
Betson Plastic Fire Brick Co. (Inc.), Box 368-A, Rome, N. Y.
Botfield Specialties Co., 776 S. Swanson St. Philadelphia, Pa.
*CELITE PRODUCTS CO., 11 Broadway, New York, N. Y...*p. 135*
*CRESCENT REFRACTORIES CO., Curwensville, Clearfield County, Pa...*p. 136*
*JOHNS-MANVILLE (Inc.), New York N. Y...*p. 244*
Jointless Fire Brick Co. (''Plibrico''), 1130 Clay St., Chicago, Ill.
*KING REFRACTORIES CO. (Inc.) (''Flame Brand''), 1709 Niagara St., Buffalo, N. Y...*p. 137*
McLeod & Henry Co. (''Steel Mixture'') Troy, N. Y.
Walsh Fire Clay Products Co., 4070 N. Main St., St. Louis, Mo.
*WASHBURN & GRANGER (Inc.) (''Dean''), 50 Church St., New York N. Y...*p. 127*

—Gas Producer
*CRESCENT REFRACTORIES CO., Curwensville, Clearfield County, Pa...*p. 136*

—Iron Cupola
*CRESCENT REFRACTORIES CO., Curwensville, Clearfield County, Pa...*p. 136*

—Ladle
*CRESCENT REFRACTORIES CO., Curwensville, Clearfield County, Pa...*p. 136*

—Stack
*JOHNS-MANVILLE (Inc.), New York, N. Y...*p. 244*

—Tube and Ball Mill
*FULLER-LEHIGH CO., Fullerton, Pa...*p. 128*

LINKS, REPAIR
Keystone Drop Forge Works (''Keystone''), Chester, Pa.
NEWHALL CHAIN FORGE & IRON CO., 90 West St., New York, N. Y...*p. 410*

LINOLEUM MAKING MACHINERY
Farrel Foundry & Mach. Co., Ansonia, Conn.

LIQUID FUEL EQUIPMENT
*BEST, W. N. FURNACE & BURNER CORPN. (''Calorex''), 11 Broadway, N. Y...*pp. 130, 531*

LOADERS

—Box Car
*BROWN HOISTING MACHINERY CO., Cleveland, Ohio. *p. 390*
*HENDRICK MFG. CO., Carbondale, Pa...*p. 653*
Manierre Engineering & Machinery Co., 622 Colby Abbot Building, Milwaukee, Wis.
WELLER MFG. CO., 1820-1856 N. Kostner Ave., Chicago, Ill. *p. 381*

—End
HOLMES, ROBT. & BROS. (Inc.), Danville, Ill...*pp. 386, 387*

—Log
AMERICAN HOIST & DERRICK CO., St. Paul, Minn...*p. 383*
*LIDGERWOOD MFG. CO., 96 Liberty St., New York, N. Y...*p. 388*

—Portable
Brown Portable Conveying Machinery Co., Chicago, Ill.
JEFFREY MFG. CO., 904 N. 4th St., Columbus, Ohio...*pp. 376, 377*
WELLER MFG. CO., 1820-1856 N. Kostner Ave., Chicago, Ill...*p. 381*

—Ship
Rownson, Drew & Clydesdale (Inc.), 80 Wall St., New York, N. Y.

—Wagon
Barber-Greene Co., Aurora, Ill.
Conant Machine Co., Concord Junction, Mass.
*GIFFORD-WOOD CO., Hudson, N. Y...*pp. 372*
Hniss, George Mfg. Co. (Inc.), 141st St & Rider Ave., New York, N. Y.
JEFFREY MFG. CO., 904 N. 4th St., Columbus, Ohio...*pp. 376, 377*
WELLER MFG. CO., 1820-1856 N. Kostner Ave., Chicago, Ill...*p. 381*

LOCKERS (Metal)
Darby, Edward & Sons Co., 412 No. 18th St., Philadelphia, Pa.
Dexter Metal Mfg. Co., Camden, N. J.
Durand Steel Locker Co., 76 W. Monroe St., Chicago, Ill.
Keighley, S. Metal Ceiling and Mfg. Co., 124 3rd Ave., Pittsburgh, Pa.
Lyon Metallic Mfg. Co., Aurora, Ill.
Narragansett Machine Co., Providence, R. I.
Terrell's Equipment Co., Grand Rapids, Mich.

LOCOMOTIVES

—Compressed Air
Porter, H. K. Co., 1208 Union Bank Bldg., Pittsburgh, Pa.

—Contractors'
American Locomotive Co., 30 Church St., New York, N. Y.
Cummings Machine Co., Minster, Ohio
Fate-Root-Heath Co., Plymouth, Ohio
Heisler Locomotive Works, 16th & Hickory Sts., Erie, Pa.

Digitized by Google

JEFFREY MFG. CO., 904 N. 4th St., Columbus, Ohio...*pp. 376, 377*

—Electric
Atlas Car & Mfg. Co., Cleveland, Ohio
Baldwin Locomotive Works, Philadelphia, Pa.
*GENERAL ELECTRIC CO., Schenectady, N. Y...*pp. 18, 19, 20, 21*
HUNT, C. W. CO. (Inc.), West New Brighton, Staten Island, N. Y...*pp. 374, 375*
Ironton Engine Co., Ironton, Ohio
JEFFREY MFG. CO., 904 N. 4th St., Columbus, Ohio...*pp. 376, 377*
Koppel Industrial Car & Equipment Co., Koppel, Pa.
Morgan-Gardner Electric Co., 27th & Shields Ave., Chicago, Ill.
Simplex Surface Contact Co., Williamsport, Pa.
*WESTINGHOUSE ELECTRIC & MFG. CO., East Pittsburgh, Pa...*pp. 160, 161*

—Electric (Storage Battery)
Atlas Car & Mfg. Co., Ivanhoe Rd., Cleveland, Ohio
Automatic Transportation Co., Buffalo, N. Y.
BAKER, R. & L. CO., Cleveland, Ohio...*p. 382*
*GENERAL ELECTRIC CO., Schenectady, N. Y...*pp. 18, 19, 20, 21*
Goodman Mfg. Co., Halsted St. & 49th St., Chicago, Ill.
*HUNT, C. W. CO. (Inc.), West New Brighton, Staten Island, N. Y...*pp. 374, 375*
Ironton Engine Co., Ironton, Ohio
JEFFREY MFG. CO., 904 N. 4th St., Columbus, Ohio...*pp. 376, 377*
Mancha Storage Battery Locomotive Co., 1909 S. Kings Highway, St. Louis, Mo.
*WESTINGHOUSE ELECTRIC & MFG. CO., East Pittsburgh, Pa...*pp. 160, 161*
Whitcomb, George D. Co., Rochelle, Ill.

—Fireless
Porter, H. K. Co., 1208 Union Bank Bldg., Pittsburgh, Pa.

—Gasoline
Baldwin Locomotive Works, Philadelphia, Pa.
Bell Locomotive Works (Inc.), 11 Pine St., New York, N. Y.
Cummings Machine Co., Minster, Ohio
Fate-Root-Heath Co., Plymouth, Ohio
Hadfield-Penfield Steel Co., Bucyrus, Ohio
McKeen Motor Car Co., 1222 Webster St., Omaha, Nebr.
Whitcomb, George D. Co., Rochelle, Ill.

—Geared
Bell Locomotive Works (Inc.), 11 Pine St., New York, N. Y.
Climax Mfg. Co., Corry, Pa.
Davenport Locomotive Works, Davenport, Ia.
Heisler Locomotive Works, Erie, Pa.
Lima Locomotive Works (Inc.), 17 East 42nd St., New York, N. Y.

—Logging
Climax Mfg. Co., Corry, Pa.
Heisler Locomotive Works, 16th & Hickory Sts., Erie, Pa.
Lima Locomotive Works (Inc.), 17th East 42nd St., New York, N. Y.

—Mine
American Locomotive Co., 30 Church St., New York, N. Y.
Fate-Root-Heath Co., Plymouth, Ohio
*GENERAL ELECTRIC CO., Schenectady, N. Y...*pp. 18, 19, 20, 21*
Goodman Mfg. Co., Halsted St. & 49th St., Chicago, Ill.
JEFFREY MFG. CO., 904 N. 4th St., Columbus, Ohio...*pp. 376, 377*
Kester Electric Co., 420 North 3rd St., Terre Haute, Ind.

—Steam
American Locomotive Co., 30 Church St., New York, N. Y.
Baldwin Locomotive Works, Philadelphia, Pa.
Bell Locomotive Works (Inc.), 11 Pine St., New York, N. Y.
Davenport Locomotive Works, Davenport, Ia.
Lima Locomotive Works (Inc.), 17 East 42nd St., New York, N. Y.
Porter, H. K. Co., 1208 Union Bank Bldg., Pittsburgh, Pa.
Vulcan Iron Works, Wilkes-Barre, Pa.

LOG HAULERS
Phoenix Mfg. Co., Eau Claire, Wis.

LOGGING MACHINERY
Flory, S. Mfg. Co., Bangor, Pa.
Garland, M. Co., Bay City, Mich.
*LIDGERWOOD MFG. CO., 96 Liberty St., New York, N. Y...*p. 388*
Phoenix Mfg. Co., Eau Claire, Wis.
Ryther & Pringle Co., Carthage, N. Y.
Washington Iron Works, 1100 Seattle Boulevard, Seattle, Wash.

LOOMS
Fletcher Works, Glenwood Ave. & 2nd St., Philadelphia, Pa.
UNION ENGINEERING CO., Cleveland, O...*p. 645*

—Circular
ROYLE, JOHN & SONS, Paterson, N. J...*p. 648*

LUBRICANTS
Atlas Brass Foundry Co., Columbus, Ohio
Borne, Scrymser Co. (''Turboil''), 80 South St., New York, N. Y.
Chard & Howe, 256 Front St., New York, N. Y.
CHICAGO PNEUMATIC TOOL CO., (''Air-oilene''), 6 E. 44th St., New York, N. Y. ..*p. 648*
COOK'S ADAM SONS, 708-710 Washington St., New York, N. Y...*p. 351*
Dexter Oil Co., 318 Sixth Ave., Pittsburgh, Pa.
Ironsides Co., Columbus, Ohio
Kellogg, E. H. & Co., 243-244 South St., New York, N. Y.
Keystone Lubricating Co., 21st, Clearfield & Lippincott Sts., Philadelphia, Pa.
New York & New Jersey Lubricant Co., 165 Broadway, New York, N. Y.
New York Lubricating Oil Co., 116 Broad St., New York, N. Y.
Philadelphia Grease Mfg Co., 848-850 S. Swanson St., Philadelphia, Pa.
Standard Oil Co., 910 S. Michigan Ave., Chicago, Ill.
Sun Co., 1428 S. Penn Square, Philadelphia, Pa.
Swan & Finch Co. (''Slo-Flo''), 522 5th Ave., New York, N. Y.
Texas Company (The), (''Texaco''), 17 Battery Place, New York, N. Y.
TIDE WATER OIL CO., 11 Broadway, New York, N. Y...*pp. 352, 353*
Watt's, John M. Sons, 54 N. Second St., Philadelphia, Pa.
Waverly Oil Works Co., 54th St., Pittsburgh, Pa.
White & Bagley Co., (''Oilsum''), 100 Foster St., Worcester, Mass.
Wolverine Lubricants Co. of New York (''Wolf's Head Oil''), 44 Whitehall St., New York, N. Y.

—Automobile
Indian Refining Co. (Inc.), 244 Madison Ave., New York, N. Y.
Robinson, Wm. C. & Son Co. (''Autoline''), 32 South St., Baltimore, Md.
TIDE WATER OIL CO. (''Veedol''), 11 Broadway, New York, N. Y...*pp. 352, 353*

Lu

Digitized by Google

Vacuum Oil Co. (''Gargoyle Mobiloils''), 61 Broadway, New York, N. Y.
White Star Refining Co., 614 Avery Ave., Detroit, Mich.

—Flake Mica
U. S. Mica Mfg. Co., 14 E. Jackson Blvd., Chicago, Ill.

—Graphite
COOK'S, ADAM SONS, 708-710 Washington St., New York, N. Y...*p. 251*

LUBRICATORS
AMERICAN INJECTOR CO., Detroit, Mich. ..*p. 217*
American Lubricator Co., Detroit, Mich.
Bowden Products Corpn. (''Empress''), Auburn, N. Y.
Collins Metallic Packing Co. (''Collins''), 56-58 N. Second St., Philadelphia, Pa.
Hills-McCanna Co., 2025 Elston Ave., Chicago, Ill.
KELLY & JONES CO., Greensburg, Pa...*pp. 182, 183*
Nathan Mfg. Co., 21 East Fortieth St., New York, N. Y.
Ohio Injectors Co., S. Main St., Wadsworth, Ohio
Powell, Wm. Co., 2525 Spring Grove Ave., Cincinnati, Ohio
Williams, D. T. Valve Co., Spring Grove Ave. & Township St., Cincinnati, Ohio

—Driving Box (Locomotive)
Edna Brass Mfg. Co., 525-33 Reading Rd., Cincinnati, Ohio

—Elevator
Kingsbridge Machine Works, Kingsbridge, New York, N. Y.

—Force-Feed
Detroit Lubricator Co., Detroit, Mich.
Dorn & Marcellus Co., Kinsey & Hedge Sts., Philadelphia, Pa.
*GREENE, TWEED & CO. (''Rochester Automatic''), 109 Duane St., New York, N. Y...*p. 250*
Inter-State Machine Products Co., Rochester, N. Y.
Krahn Mfg. Co., 590 Clinton St., Milwaukee, Wis.
*LUNKENHEIMER CO., Cincinnati, Ohio... *pp. 184, 185, 186, 187, 188, 189*
McCord Mfg. Co. (Inc.), Detroit, Mich.
McCullough Mfg. Co., 2632-2634 Central Ave., Minneapolis, Minn.
Madison-Kipp Corpn. (''Kipp''), Madison, Wis.
Manzel Bros. Co. (''Manzel''), 315 Babcock St., Buffalo, N. Y.
PICKERING GOVERNOR CO., Portland, Conn...*p. 247*
*RICHARDSON-PHENIX CO., 126 Reservoir Ave., Milwaukee, Wis...*pp. 248, 249*

—Graphite
National Graphite Lubricator Co., Scranton, Pa.
*RICHARDSON-PHENIX CO., 126 Reservoir Ave., Milwaukee, Wis...*pp. 248, 249*

—Graphite Sheet
Randall Graphite Products Corpn., 721 Fulton St., Chicago, Ill.

—Hydrostatic
Detroit Lubricator Co., Detroit, Mich.
Essex, G. B. Brass Corpn., 2000 Franklin St., Detroit, Mich.
Flower, Walter L. & Co., 312-314 S. 8th St., St Louis, Mo.
*LUNKENHEIMER CO., Cincinnati, Ohio... *pp. 184, 185, 186, 187, 188, 189*

—Shafting
Swain Co., 443 W. 31st St., Chicago, Ill.

LUMBER STACKING MACHINES
Godfrey Conveyor Co., Elkhart, Ind.
Soule Steam Feed Works, Meridan, Miss.

M

MACHINE HANDLES, SCREWS, ETC.
(See Handles, Screws, Etc., Machine)

MACHINE PARTS (Special)
AUTOMATIC PRODUCTS CORPN., 199-203 Eighth St., Long Island City, N. Y...*p. 518*
Babson-Dow Mfg. Co., 60 Fulda St., Roxbury, Boston, Mass.
Lincoln Machine Co., 1068 Main St., Pawtucket, R. I.

MACHINE TOOL FEED CONTROL SYSTEMS (Oil Pressure)
OILGEAR COMPANY, 60-62-64 27th St., Milwaukee, Wis...*p. 483*

MACHINE TOOLS
American Machine Tool Engrg. Wks., 4854 W. Kinzie St., Chicago, Ill.
AMERICAN TOOL & MACHINE CO., Boston 9, Mass...*p. 614*
American Tool Works Co., Pearl & Eggleston Ave., Cincinnati, Ohio
Ashley Machine Works, 714 University Ave., Rochester, N. Y.
BERTSCH & CO., Cambridge City, Ind...*p. 442*
BLANCHARD MACHINE CO., Cambridge 39, Mass...*p. 484*
Boeger-Meyer Machine & Tool Co., 59-65 McWhorter St., Newark, N. J.
Bullard Machine Tool Co., Bridgeport, Conn.
Chicago Machine Tool Co., 647 W. Washington Blvd., Chicago, Ill.
Cincinnati Lathe & Tool Co., 3207-3211 North St., Oakley, Cincinnati, Ohio
Cincinnati Milling Machine Co., Cincinnati, Ohio
Cisco Machine Tool Co., Elmore & Ch. & D. Ry., Cincinnati, Ohio
COLBURN MACHINE TOOL CO. (The). Cleveland, Ohio...*pp. 466, 467*
DILL, T. C. MACHINE CO. (Inc.), Philadelphia, Pa...*p. 468*
Enterprise Machinery Co., 30 S. Clinton St., Chicago, Ill.
FAIRBANKS CO., 416 Broome St., New York, N. Y...*pp. 174, 175*
*FELLOWS GEAR SHAPER CO., Springfield, Vt...*pp. 472, 473*
Gray, G. A. Co., Gest & Depot Sts., Cincinnati, Ohio
HERCULES MACHINE & TOOL CO. (Inc.), Broome & Lafayette Sts., New York, N. Y. ..*p. 476*
Holland Machine Co., 132 Water St., South Norwalk, Conn.
Hollingworth Machine Tool Co., 2nd & Greenup Sts., Covington, Ky.
INTERNATIONAL MACHINE TOOL CO. (''Libby''), 1124 W. 21st St. & Belt Railway, Indianapolis, Ind...*pp. 448, 449*
Jackson Machine Tool Co., 314 N. Jackson St., Jackson, Mich.
*JONES & LAMSON MACHINE CO., Springfield, Vt...*pp. 450, 451, 452, 453, 454*
KEARNEY & TRECKER, Milwaukee, Wis... *p. 480*
*LANDIS MACHINE CO. (Inc.), Waynesboro, Pa...*pp. 496, 497*
LIBERTY MACHINE TOOL CO., Hamilton, Ohio...*p. 469*
Lynd-Farquhar Co., 419-425 Atlantic Ave., Boston, Mass.
McCabe, J. J., 149 Broadway, New York, N. Y.
Manning, Maxwell & Moore (Inc.), 119 W. 40th St., New York, N. Y.
MILLHOLLAND MACHINE CO., Indianapolis, Ind...*p. 455*
Minster Machine Co., Minster, Ohio
Mueller Machine Tool Co., 2425 Colerain Ave., Cincinnati, Ohio

Digitized by Google

Multiplex Tool Co. (Inc.), 76 S. 8th St., Brooklyn, N. Y.
NILES-BEMENT-POND CO., 111 Broadway, New York, N. Y...*p. 470*
Phoenix Mfg. Co., Eau Claire, Wis.
PRATT & WHITNEY CO., 111 Broadway, New York, N. Y...*p. 471*
Rahn-Larmon Co., 2941 Spring Grove Ave., Cincinnati, Ohio
Ryerson, Joseph T. & Son, 16th & Rockwell Sts., Chicago, Ill.
St. Louis Machine Tool Co., 932 Loughborough Ave., St. Louis, Mo.
Sebastian Lathe Co., Cincinnati, Ohio
Sellers, Wm. & Co. (Inc.), Philadelphia, Pa.
Simmons Machine Co. (Inc.), 985 Broadway, Albany, N. Y.
SMALLEY-GENERAL CO. (Inc.), Bay City, Mich...*p. 482*
Smith & Mills Co., Cincinnati, Ohio
Somers, Fitler & Todd Co., 327 Water St., Pittsburgh, Pa.
Southworth Machine Co., Warren Ave., Portland, Maine
Stecher, Charles Co., 2301-13 North Knox Ave., Chicago, Ill.
STEINLE TURRET MACHINE CO., Madison. Wis...*p. 447*
Stockbridge Machine Co., 68 Abbott St., Worcester, Mass.
Turner Machine Co., 28-40 Maple Ave., Danbury, Conn.
*WARNER & SWASEY CO., Cleveland, Ohio ...*pp. 456, 457*
Whitcomb-Blaisdell Machine Tool Co., Worcester, Mass.
WILLIAMS, J. H. & CO., 70 Richards St., Brooklyn, N. Y...*p. 517*
WOOD TURRET MACHINE CO, Brazil, Ind. ...*pp. 458, 459*
Woodward & Powell Planer Co., 97 Webster St., Worcester, Mass.

MACHINE WORK

Abramson Engineering Co., Union Bank Bldg., Pittsburgh, Pa.
Affa Specialty Co., 34 Southbridge St., Worcester, Mass.
Ashley Machine Works, 714 University Ave., Rochester, N. Y.
Atlas Brass Foundry Co., Columbus, Ohio
Automatic Machine Co., Bridgeport, Conn.
Bauroth Brothers, Springfield, Ohio
BLAKE & JOHNSON CO., Waterbury, Conn. ...*p. 491*
Braddock Mfg. Co., Braddock, Pa.
Bradley Machine Co., Bridgeport, Conn.
BUDD GRATE CO., 2013 E. Letterly St., Philadelphia, Pa...*p. 123*
BURROUGHS, CHARLES CO. (The), Newark, N. J...*p. 590*
*CALDWELL, H. W. & SON CO., 17th St. & Western Ave, Chicago, Ill...*p 370*
Carver Cotton Gin Co., East Bridgewater, Mass.
Columbia Machine Tool Co., Fairgrove Ave., Hamilton, Ohio
Cowdrey, C. H. Machine Works, 20 Main St., Fitchburg, Mass.
Currier, Cyrus & Sons, Newark, N. J.
Eagan-Rogers Steel & Iron Co., Crum Lynne, Pa.
Easton Machine Co., Washington St., South Easton, Mass.
Eastwood Wire Mfg. Co., Belleville, N. J.
ELLICOTT MACHINE CORP'N, Baltimore Md...*p 588*
Empire Axle Co., Dunkirk, N. Y.
*FALLS CLUTCH & MACHINERY CO., Cuyahoga Falls, Ohio...*p. 330*
FULTON IRON WORKS CO., St. Louis, Mo. ...*p. 37*
Fulton Machine Tool Co., 1422 W. Randolff St., Chicago, Ill.
GEUDER, PAESCHKE & FREY CO., Western Valley, Milwaukee, Wis...*p. 434*
Gibbs Gas Engine Co. of Florida, 26 S. Main St., Jacksonville, Fla.
Gillespie Mfg. Corpn., 12th & Monmouth Sts., Jersey City, N. J.
Gray Machine Tool Co. (Inc.), 2651 Main St, Buffalo, N Y.
Gurney Elevator Co, Honesdale, Pa.
Hafer Foundry & Machine Works, Chambersburg, Pa.
Hart, Frederick & Co. (Inc.), 837 Main St., Poughkeepsie, N. Y.
Hartford Special Machinery Co., 287 Homestead Ave., Hartford, Conn.
Hefner & Maysilles, Grafton, W. Va.
Hess & Barker, 212-22 So. Darien St., Philadelphia, Pa.
*HILL CLUTCH CO., Cleveland, Ohio...*p. 331*
*JOHNSON, CARLYLE MACHINE CO. (The), Manchester, Conn...*p. 332*
Johnston & Jennings Co., E. 65th St. & N. Y. C. R. R., Cleveland, Ohio
JONES, W. A. FOUNDRY & MACHINE CO., 4415 West Roosevelt Road, Chicago, Ill. ...*pp. 312, 313, 314, 315*
Katzenstein, L. & Co., 358 West St., New York, N. Y.
Keystone-Hindley Gear Co., 20th St. & Indiana Ave., Philadelphia, Pa.
Klotz Machine Co., 318 W. Water St., Sandusky, Ohio
Knowlson & Kelly, Troy, N. Y.
Kremer-Cummins Machine Co., 1833 E. 55th St., Cleveland, Ohio
Kutztown Foundry & Machine Co., 1421 Chestnut St., Philadelphia, Pa.
*LAMMERT & MANN CO., Wood & Walnut Sts., Chicago, Ill...*p. 561*
Lebanon Gear & Machine Wks., 15th & Willow Sts., Lebanon, Pa.
Lombard Iron Work & Supply Co., Augusta, Ga.
Lyall, J. & W. Loom & Machine Co., Passaic, N. J.
Marx, A. & Sons, 1545 Tchoupitoulas St., New Orleans, La.
Meisselbach-Catucci Mfg. Co., 57 Stanton St., Newark, N. J.
Milholland, J. & J. B. Co, 718 Fifth Ave., Pittsburgh, Pa.
Modern Mfg. Co., 75 Third St., Bridgeport, Conn.
Modern Pattern & Machine Co., 451 Monroe Ave., Detroit, Mich.
Morgans & Wilcox Mfg. Co., Middletown, N. Y.
Munson, E. G., Carton Ave., Utica, N. Y.
National Gauge Co., 300 Pacific St, Brooklyn, N. Y.
Nazareth Foundry & Machine Co., 41-45 Easton Road, Nazareth, Pa.
Nelsonville Foundry & Machine Co., Nelsonville, Ohio
Nestor Mfg. Co., 40 W. 13th St., New York, N. Y.
Oat, Joseph & Sons, 232 Quarry St., Philadelphia, Pa.
Phoenix Ice Machine Co., 2711 Church Ave., Cleveland, Ohio
*PITTSBURGH VALVE, FOUNDRY & CONSTRUCTION CO., P. O. Box 1016, Pittsburgh, Pa...*pp. 192, 193*
Plamondon, A. Mfg. Co., 5300 Western Boul., Chicago, Ill.
Production Tool & Engrg. Co., 507 W. Jackson Blvd, Chicago, Ill.
PROVIDENCE ENGINEERING CORPN., Providence, R. I...*p. 12*
Riverside Machine Co., Front & Penn Sts., Chester, Pa.
Rochester Welding Works, 349 Orchard St., Rochester, N. Y.

Ma

Digitized by Google

Root, B. N. Co., York, Pa.
Russell Wheel & Foundry Co, Detroit, Mich.
Shepard Lathe Co., Rising Sun, Ind.
Sackett, A. J., 5th Ave. & 1st St., Baltimore, Md.
Schaeffer Machine Works, 35th & Grays Ferry Road, Philadelphia, Pa.
Slocum, F. F. & Co. (Inc.), Wilmington, Del.
Smithe, F. L. Machine Co (Inc.), 150 11th Ave., New York, N. Y.
Sommerfield Machine & Mfg. Co., 220 2nd Ave., Pittsburgh, Pa.
Standard Engineering Co., Ellwood City, Pa.
Tioga Steel & Iron Co., 52nd & Gray's Ave., Philadelphia, Pa.
TORRINGTON MFG. CO., Torrington, Conn. *p. 641*
Townsend Furnace & Machine Shop Co., Broadway & Rensselaer St., Albany, N. Y.
Union Gear & Machine Co., 27 Purchase St., Boston, Mass.
UNION ENGINEERING CO., Cleveland, O. *..p. 645*
*VILTER MFG. CO., 1194-1196 Clinton St., Milwaukee, Wis. *..pp. 16, 17*
West Coast Iron Works, 4601-9 Fourteenth Ave., N. W., Seattle, Wash.
Wicaco Screw and Machine Works, Inc., N. E. Cor. 7th St. & Wood St., Philadelphia, Pa.
Winchester Repeating Arms Co., New Haven, Conn.

MACHINERY AND MACHINES: *See*

Agricultural
Armoring, Hose and Cable
Auger
Automobile Body
Automobile Fender
Automobile Parts

Bag Filling
Bag Making
Baker's
Balancing
Bale Breaking
Ball Winding
Beading
Bearing Testing
Bending and Straightening
Bending
Blacksmith's
Blanking
Bleaching
Blue Printing
Bolt and Nut
Book Binders
Boring and Drilling
Boring and Tapping
Boring
Boring, Drilling and Milling
Bottle Blowing
Bottle Cartoning
Bottle Graduating
Bottle Mold Cutting
Bottle Washing
Bottling
Box Making
Braiding
Brass Mill
Brass Working
Brick Making
Briquetting
Broaching
Buckle Making

Cable Making
Cabling and Stranding
Calking
Can Making
Can Washing
Candy Making
Canning
Car Shop
Carbonic Acid Gas
Cartridge Making
Carton Making
Carton Sealing
Casting
Celluloid
Cement Making
Cement Testing
Centering
Cereal Mill
Chain
Chain Testing
Channel Forming
Channeling
Charging
Chocolate Making
Chucking
Cigar Making
Cigarette Making
Clay Washing
Clay Working
Cloth Coating
Cloth Testing
Coal and Ash Handling
Coal Cutting
Coal Mining
Coffee
Coke Oven
Cold Rolling
Concentrating
Concrete Mixing
Confectioners'
Conveying
Coopers'
Coping
Copper Converting
Copper Scraping
Core Making
Corrugating
Cotton Ginning
Cotton Manufacturing
Crank Pin Turning
Crushing and Grinding
Cutting
Cutting-Off

Dairy
Die Cutting
Die Forming
Die Muzzling
Die Sinking
Digging
Disintegrating
Drafting
Dredging
Drilling and Tapping
Drilling
Drying
Dyeing

Edging
Electric
Electrotyping
Elevating and Conveying
Engraving
Envelope Making
Excavating

Fabric Cutting
Farm
Fertilizer Manufacturing
Fibre Case
Fibre Making
File Sharpening
Filing and Hacksaw
Filing
Fire Hose
Flanging
Floor Scrubbing
Flour Mill
Folding
Forging and Upsetting
Forging
Forming

Gaging
Gas Plant
Gear Cleaning and Grinding
Gear Cutting
Gear Hobbing
Gear Molding
Gear Tooth Rounding
Glass Beveling
Glass Blowing
Glass Graduating
Glass Works
Graduating
Grain Handling
Grinding and Screen Separating
Grinding
Gun Making

Heading
Heading, Upsetting and Forging
Heating
Hobbing
Hoisting
Hydraulic
Hydro-Pneumatic

Ice Handling
Ice Making
Insulating
Ironing
Irrigation

Jacquard Card
Jolt Ramming

Keyseating

Labeling
Lamp Making
Lapping
Lead Pipe
Lead Trap
Leather Skiving
Leather Splitting
Leather Working
Linoleum Making
Logging
Lumber Stacking

Malting
Marking
Measuring and Mixing
Measuring
Metal Wheel
Milk Handling
Milling and Drilling
Milling

Digitized by Google

Mining and Concentrating
Mining
Mixing
Molding and Shaping
Molding
Mortising
Mucking

Nail Making
Nipple Threading
Notching
Nut Making

Oil Cloth Printing
Oil Separating
Oil Testing
Oil Well
Ore Concentrating
Ore Handling
Ore Mill
Ore Milling
Ore Washing
Overhauling

Packaging
Packing
Paint Making
Paper Bag
Paper Coating
Paper Feeding
Paper Finishing
Paper Mill
Paper Pulp
Paper Testing
Paper Working
Pattern Shop
Pharmaceutical
Photo Engraver
Photographic Copying
Piano Action Making
Pickling
Pin Making
Pinion Cutting
Pinking
Pipe Bending
Pipe Cutting and Threading
Pipe Cutting-Off
Pipe Expanding and Flanging
Pipe Mill
Piston Turning
Planing, Wood
Plaster Mill
Plywood
Polishing
Pottery
Power Transmission
Printers
Profiling
Pulp
Pulverizing and Air Separating
Punching and Coping
Punching and Shearing

Quarrying
Quenching

Rail Breaking
Reaming and Countersinking
Refrigerating
Rice Milling
Rifling
Rivet and Bolt Heading
Rivet Making
Riveting
Road Making
Road Material Testing
Rod Pointing
Rolling Mill
Rope Making
Routing
Rubber Mill
Rubber Testing
Rubber Tire
Rubber Tubing

Salt Making
Sampling
Sand Cutting
Saw Mill
Saw Sharpening
Sawing
Scraping
Screw
Screw Driving
Screw Thread Rolling
Sealing
Sewer Pipe
Sheet Lead
Sheet Metal Working
Sheet Mill
Shell Making
Shipyard
Shredding
Shoe Lace Tipping
Shoe Making
Shovel Making
Shoveling
Sifting
Silk Manufacturing
Sintering Plant
Slate Working
Slitting and Rewinding
Slitting
Slotting
Smelting
Solder Wire
Special
Spike
Spot-Setting
Spraying
Spring Making
Spring Testing
Spun Silk Manufacturing
Starch Making
Stone Working
Sugar
Swaging
Syrup

Tablet Making
Tack Making
Tamping
Tapping
Testing
Textile
Textile Finishing
Textile Wet Finishing
Threading
Ticket Cancelling
Tie Working
Tiering
Tile Making
Tin Foil
Tin Foil Making
Tin Pipe
Tinplate
Tinware
Tinsmith's
Tire Setting
Tire Welding
Tobacco Manufacturing
Transmission
Trench Digging
Trimming
Tube Bending and Coiling
Tube Drawing
Tube Mill
Tube Rolling
Tube Tapering
Turnbuckle
Turning and Straightening
Turret
Twist Drill Making

Upsetting

Vacuum Cleaning
Valve Inserting
Valve Reseating
Valve Seating
Veneer Cutting

Vibration Indicating

Washing and Screening
Washing
Weighing
Welding
Well Drilling
Winding
Wire Bunching
Wire Coiling
Wire Drawing
Wire Enameling
Wire Forming
Wire Insulating
Wire Measuring
Wire Mill
Wire Nail Making
Wire Reclaiming
Wire Respooling
Wire Rope
Wire Straightening and Cutting
Wire Stranding
Wire Testing
Wood Screw
Wood Working
Woolen Manufacturing
Worsted Manufacturing
Wrapping

Yarn Dressing

MACHINERY GUARDS
Diamond Manufacturing Co., Wyoming, Pa.
WATERTOWN ENGINE & MACHINE CO., Watertown, N. Y...*p. 51*

—Perforated Metal
Erdle Perforating Co., 171 York St., Rochester, N. Y.
*HENDRICK MFG. CO., Carbondale, Pa...*p. 653*

MACHINERY VIBRATION INSULATION
Union Fibre Co., Winona, Minn.

MAGNESIA PRODUCTS
CAREY, PHILIP CO., Cincinnati, Ohio...*p. 245*
EHRET MAGNESIA MFG. CO., Valley Forge, Pa...*p. 245*
FRANKLIN MFG. CO., Franklin, Pa...*p. 245*
*JOHNS-MANVILLE (Inc.), New York, N. Y...*p. 244*
*MAGNESIA ASSOCIATION OF AMERICA, Bulletin Bldg., Philadelphia, Pa...*p. 245*

MAGNETS, LIFTING
Cutler-Hammer Mfg. Co., 12th St. & St. Paul Ave., Milwaukee, Wis.

Ma

Digitized by Google

Electric Controller & Mfg. Co., 2700 E. 79th St., Cleveland, Ohio
Ohio Electric & Controller Co., 5900 Maurice Ave., Cleveland, Ohio

MALTING MACHINERY
GALLAND-HENNING MFG. CO., Milwaukee, Wis...*pp. 592, 683*

MANDRELS
ATKINS, E. C. & CO. (Inc.), Indianapolis, Ind...*p. 506*
BIGGS BOILER WORKS CO., Case Ave. & Newton St., Akron, Ohio...*p. 650*
CLEVELAND TWIST DRILL CO., Cleveland, Ohio...*p. 502*
PRATT & WHITNEY CO., 111 Broadway, New York, N. Y...*p. 471*

—Blacksmiths'
Noyes, B. B. Co., Greenfield, Mass.

—Expanding
Nicholson, W. H. & Co., 120 Oregon St., Wilkes-Barre, Pa.
Western Tool & Mfg. Co., Springfield, Ohio

—Expanding (Air-Operated)
Hannifan Mfg. Co., 621-31 S. Kilman Ave., Chicago, Ill.
Frank G. Payson Co. ("Logan"), 9 So. Clinton St., Chicago, Ill.

MANHOLES
CLOW, JAMES B. & SONS, 534 So. Franklin St., Chicago, Ill...*pp. 230, 231*
*WASHBURN & GRANGER (Inc.), 50 Church St., New York, N. Y...*p. 127*

MANIFOLDS
American Tube Bending Co., 5-7-9 Lawrence St., New Haven, Conn.
KELLY & JONES CO., Greensburg, Pa...*pp. 182, 183*
KOVEN, L. O. & BROTHER, 154 Ogden Ave., Jersey City, N. J...*p. 605*
*PITTSBURGH VALVE, FOUNDRY & CONSTRUCTION CO., P. O. Box 1016, Pittsburgh, Pa...*pp. 192, 193*
*READING VALVE & FITTINGS CO., (Reading Division), Reading, Pa...*pp. 238, 239*
*U. S. CAST IRON PIPE & FOUNDRY CO., Burlington, N. J...*pp. 232, 233*

—Welded Pipe
Best Co., 1409 Arvott Bldg., Pittsburgh, Pa.

MANOMETERS
BACHARACH INDUSTRIAL INSTRUMENT CO., Pittsburgh, Pa...*p. 279*
*FOXBORO CO. (Inc.), Foxboro, Mass...*p. 293*
Meriam Co., 8405 Detroit Ave., Cleveland, O.
*PRECISION INSTRUMENT CO., Newark, N. J...*pp. 284, 285*
*REPUBLIC FLOW METERS CO., 2240 Diversey Parkway, Chicago, Ill...*p. 281*
SCHAEFER & BUDDENBERG MFG. CO., Brooklyn, N. Y...*p. 295*
TAGLIABUE, C. J. MFG. CO., 18-88 33rd St., Brooklyn, N. Y...*p. 296*

MARBLE
CLOW, JAMES B. & SONS, 534 So. Franklin St., Chicago, Ill...*pp. 231, 232*

MARINE MACHINERY (Auxiliary)
Bethlehem Shipbuilding Corpn. (Ltd.), Bethlehem, Pa.

MARKING DEVICES
Matthews, Jas. H. & Co., 3942 Forbes St., Pittsburgh, Pa.
NOBLE & WESTBROOK MFG. CO., Hartford, Conn...*p. 494*

MARKING MACHINES
NOBLE & WESTBROOK MFG. CO., Hartford, Conn...*p. 494*

MATCH PLATES (Foundry)
Nicholls, Wm. H. Co., 2-10 College Place, Brooklyn, N. Y.

MEASURING AND MIXING MACHINES
CONVEYING WEIGHER CO., 90 West St., New York, N. Y...*p. 371*

MEASURING MACHINES

—Lumber
Tally-Meter Co., 17 Elmwood Ave., Norwich, Conn.

—Wire
NEW ENGLAND BUTT CO., Providence, R. I...*p. 639*
TEXTILE MACHINE WORKS, Reading, Pa. ..*p. 644*

MECHANICAL DRAFT APPARATUS
*AMERICAN BLOWER CO., Detroit, Mich. ..*p. 553*
Buffalo Forge Co., 490 Broadway, Buffalo, N. Y.
CLARAGE FAN CO., Kalamazoo, Mich...*pp. 556, 557*
COPPUS ENGINEERING & EQUIPMENT CO., 342-348 Park Ave., Worcester, Mass. ..*pp. 104, 105*
*DE LAVAL STEAM TURBINE CO., Trenton, N. J...*p. 22*
*GREEN FUEL ECONOMIZER CO., Beacon, N. Y...*pp. 96, 97*
Howden, James & Co., Ltd., Wellsville, N. Y.
Kearfoot Engineering Co., Inc., 95 Liberty St., New York, N. Y.
NEW YORK BLOWER CO., Chicago, Ill.*. p. 555*
SCHUTTE & KOERTING CO., 1181 Thompson St., Philadelphia, Pa.. .p. 159
STURTEVANT, B. F. CO., Hyde Park, Boston, Mass...*p. 106*
Vapor-Vacuum Heating Co., 401 Otis Bldg., Philadelphia, Pa.

MECHANICAL STOKERS
(See Stokers)

METAL BEARINGS, HOSE, PACKING, ETC.
(See Bearings, Hose, Packing, etc., Metal)

METAL FINISHING EQUIPMENT
Divine Bros. Co., Utica, N. Y.

METAL SPINNING
*PRECISION INSTRUMENT CO., Newark, N. J...*pp. 284, 285*
Roberts Steam Specialty Co., 5318 St. Clair Ave., Cleveland, Ohio

METAL TREATING
*AMERICAN METAL TREATMENT CO., Elizabeth, N. J...*p. 535*
Connecticut Metal Treating Co. (Inc.), 207 Knowlton St., Bridgeport, Conn.
*ROCKWELL, W. S. CO., 50 Church St., New York, N. Y...*p. 529*
Tate-Jones & Co. (Inc.), Pittsburgh, Pa.
WILLIAMS, J. H. & CO., 70 Richards St., Brooklyn, N. Y...*p. 517*

METAL WHEEL MACHINERY
Heartley Machine, Variety Iron & Tool Wks., Summit & Locust Sts., Toledo, Ohio

METALLOGRAPHIC APPARATUS
Holz & Co. (Inc.), 17 Madison Ave., New York, N. Y.

METALS: *See also*
Alloys
Aluminum
Babbitt
Brass
Bronzes
Bull Ring
Copper
Ferro-Molybdenum
Ferro-Titanium
Ferro-Tungsten
Ferro-Uranium

Digitized by Google

Ferro-Vanadium
Gun
Iron
Lead
Monel
Nickel
Phosphor Copper
Phosphor Tin
Platinum
Solder
Steel
White
Zinc

—Acid Resistant
Bario-Metal Corpn., 167 W. 18th St., New York, N. Y.
*HENDRICK MFG. CO., Carbondale, Pa... *p. 653*

—Anti-Friction
ALLAN, A. & SON, Harrison, N. J...*p. 413*
DODGE SALES & ENGINEERING CO., Mishawaka, Ind...*pp. 42, 43, 326, 327, 328, 329*
Frictionless Metal Co., 1103 Chestnut St., Chattanooga, Tenn.
Leddell Metals Co. (Inc.), 281 Borden Ave., Long Island City, N. Y.
Magnolia Metal Co., 113-115 Bank St., New York, N. Y.
Pittsburgh White Metal Co., 160 Leroy St., New York, N. Y.

—Bearing
Ajax Metal Co., 46 Richmond St., Philadelphia, Pa.
ALLAN, A. & SON, Harrison, N. J...*p. 413*
AMERICAN BRASS CO., Waterbury, Conn. ..*p. 414*
DODGE SALES & ENGINEERING CO., Mishawaka, Ind...*pp. 42, 43, 326, 327, 328, 329*
Fahrig Metal Co., 34 Commerce St., New York, N. Y.
Frictionless Metal Co. (''Frictionless''), 1103 Chestnut St., Chattanooga, Tenn.
Jacobson, I. M. & Sons Co. (''Motex''), 920-928 Catherine St., Detroit, Mich.
LUMEN BEARING CO., Buffalo, N. Y...*p. 416*
Magnolia Metal Co., 113-115 Bank St., New York, N. Y.
Murdock, H. & Co., 432 Wood St., Pittsburgh, Pa.
Muzzy-Lyon Co., 517-535 W. Larned St., Detroit, Mich.
Premium Metal & Packing Co. (''Alumaloy''), Wilkinsburg, Pittsburgh, Pa.
United Smelting and Aluminum Co. (Inc.), New Haven, Conn.

—Calorized
Diamond Power Specialty Co., 956 Oakland Ave., Detroit, Mich.

—Extruded
AMERICAN BRASS CO., Waterbury, Conn. ..*p. 414*

—Heat Resisting
Bario Metal Corpn., 167 W. 18th St., New York, N. Y.

—Non-Ferrous
LUMEN BEARING CO., Buffalo, N. Y...*p. 416*
United Smelting and Aluminum Co. (Inc.), New Haven, Conn.

—Perforated
*ALLIS-CHALMERS MFG. CO., Milwaukee, Wis...*pp. 28, 29*
Cross Engineering Co., Carbondale, Pa.
Diamond Manufacturing Co., Wyoming, Pa.
Erdle Perforating Co., 171 York St., Rochester, N. Y.
Everitt Co., 261 Franklin St., Boston, Mass.
Harrington & King Perforating Co., 629 N. Union Ave., Chicago, Ill.
*HENDRICK MFG. CO., Carbondale, Pa... *p. 653*
Manhattan Perforated Metal Co., 237 Centre St., New York, N. Y.
Mundt, Charles & Sons, 53-56 Fairmount Ave., Jersey City, N. J.

—Thermostatic
Wilson, H. A. Co., 97 Chestnut St., Newark, N. J.

—Welding
QUASI-ARC WELDTRODE CO. (Inc.), 114 Hudson Ave., Peekskill, N. Y...*p. 538*
WILSON WELDER & METALS CO. (Inc.), 259 36th St., Brooklyn, N. Y...*p. 537*

—White
Die Casting Co. of New Jersey, 39 Sharon Ave., Irvington, N. J.
Imperial Type Metal Co., Philadelphia, Pa.
Leddell Metals Co. (Inc.), 281 Borden Ave., Long Island City, N. Y.
Premium Metal & Packing Co. (''Alumaloy''), Wilkinsburg, Pittsburgh, Pa.
Seymour Mfg. Co., Seymour, Conn.

METER PROTECTIVE DEVICES
Johns-Pratt Co. (''Noark''), 55 Capitol Ave., Hartford, Conn.

METER PROVERS
Equitable Meter Co., 422 First Ave., Pittsburgh, Pa.
PITTSBURG METER CO., East Pittsburgh, Pa...*p. 275*

METERS: *See also*
Ammeter
Anemometer
Barometers
Calorimeter
Dynamometer
Extensometer
Galvanometer
Hydrometer
Hygrometer
Manometer
Micrometer
Ohmmeter
Planimeter
Psychrometers
Saccharometer
Salt Concentration
Tachometer
Thermometer
Viscosimeter
Voltmeter
Watt-hour
Wattmeter

—Air
*BACHARACH INDUSTRIAL INSTRUMENT CO., Pittsburgh, Pa...*p. 279*
*BAILEY METER CO. (''Bailey''), 2009 East 46th St., Cleveland, Ohio...*p. 280*
*BUILDERS IRON FOUNDRY, Providence, R. I...*p. 277*
*FOXBORO CO. (Inc.), Foxboro, Mass...*p. 293*
Metric Metal Works, Erie, Pa.
New Jersey Meter Co., Plainfield, N. J.
PITTSBURGH METER CO., E. Pittsburgh, Pa...*p. 275*
*PRECISION INSTRUMENT CO., Newark, N. J...*pp. 284, 285*
*REPUBLIC FLOW METERS CO., 2240 Diversey Parkway, Chicago, Ill...*p. 281*
Sargent Steam Meter Co., 820-822 S. Tripp Ave., Chicago, Ill.

—Boiler Performance
*BAILEY METER CO. (''Bailey''), 2009 East 46th St., Cleveland, Ohio...*p. 280*

—Chemical Solution
*BUILDERS IRON FOUNDRY, Providence, R. I...*p. 277*

Me

Digitized by Google

—Coal
Havard, O. D. Co., Allentown, Pa.

—Compressed Air
*BAILEY METER CO. ("Bailey"), 2009 East 46th St., Cleveland, Ohio...*p. 280*
*BUILDERS IRON FOUNDRY, Providence, R. I...*p. 277*
*FOXBORO CO. (Inc.), Foxboro, Mass...*p. 293*
New Jersey Meter Co., Plainfield, N. J.
PITTSBURGH METER CO., E. Pittsburgh, Pa...*p. 275*
*REPUBLIC FLOW METERS CO., 2240 Diversey Parkway, Chicago, Ill...*p. 281*

—Condensation
AMERICAN DISTRICT STEAM CO. ("Simplex," "Rotometer"), North Tonawanda, N. Y...*p. 243*
*BUILDERS IRON FOUNDRY, Providence, R. I...*p. 277*
Central Station Steam Co., 2910 East Woodbridge St., Detroit, Mich.
Plant Engineering & Equipment Co. (Inc.), 192 Broadway, New York, N. Y.
SIMPLEX VALVE & METER CO., Philadelphia, Pa...*p. 278*
*WORTHINGTON PUMP & MACHINERY CORPN., 115 Broadway, New York, N. Y. ..*pp. 44, 45, 46, 47*

—Electric
(See Ammeters, Voltmeters, Wattmeters)

—Feed Water
*BAILEY METER CO. ("Bailey"), 2009 East 46th St., Cleveland, Ohio...*p. 280*
Buffalo Meter Co. ("Niagara"), 2917 Main St., Buffalo, N. Y.
*BUILDERS IRON FOUNDRY, Providence, R. I...*p. 277*
Central Station Steam Co., 2910 East Woodbridge St., Detroit, Mich.
*H. S. B. W. COCHRANE CORPN. ("Cochrane") Philadelphia, Pa...*pp. 146, 147*
PITTSBURGH METER CO., East Pittsburgh, Pa...*p. 275*
*REPUBLIC FLOW METERS CO., 2240 Diversey Parkway, Chicago, Ill...*p. 281*
SIMPLEX VALVE & METER CO., Philadelphia, Pa...*p. 278*
WILLCOX ENGINEERING CO., Saginaw, Mich...*pp. 272, 613*
*WORTHINGTON PUMP & MACHINERY CORPN., 115 Broadway, New York, N. Y. ..*pp. 44, 45, 46, 47*
*YARNALL-WARING CO. ("Yarway"), 7603-20 Queen St., Chestnut Hill, Philadelphia, Pa...*p. 196*

—Feed Water (Weir Type)
*BAILEY METER CO. ("Bailey"), 2009 East 46th St., Cleveland, Ohio...*p. 280*
*H. S. B. W. COCHRANE CORPN. ("Cochrane"), Philadelphia, Pa...*pp. 146, 147*
Hoppes Mfg. Co., 19 Larch St., Springfield, Ohio
SIMPLEX VALVE & METER CO., Philadelphia, Pa...*p. 278*
*YARNALL-WARING CO. ("Yarway"), 7603-20 Queen St., Chestnut Hill, Philadelphia, Pa...*p. 196*

—Flow
*BACHARACH INDUSTRIAL INSTRUMENT CO., Pittsburgh, Pa...*p. 279*
*BAILEY METER CO. ("Bailey"), 2009 East 46th St., Cleveland, Ohio...*p. 280*
*GENERAL ELECTRIC CO., Schenectady, N. Y...*pp. 18, 19, 20, 21*
New Jersey Meter Co., Plainfield, N. J.
SIMPLEX VALVE & METER CO., Philadelphia, Pa...*p. 278*
Sloan, A. H. (Inc.), ("Royer"), 410 Moffat Bldg., Detroit, Mich.
*SPRAY ENGINEERING CO. ("Vaughn"), 60 High St., Boston, Mass...*pp. 166, 167*

—Frequency
BIDDLE, JAMES G. ("Frahm"), 1211-1213 Arch St., Philadelphia, Pa...*p. 298*

—Gas
*BACHARACH INDUSTRIAL INSTRUMENT CO. ("Hydro"), Pittsburgh, Pa...*p. 279*
Equitable Meter Co., 422 First Ave., Pittsburgh, Pa.
PITTSBURGH METER CO., East Pittsburgh, Pa...*p. 275*
*REPUBLIC FLOW METERS CO., 2240 Diversey Parkway, Chicago, Ill...*p. 281*

—Gasoline
*BUILDERS IRON FOUNDRY, Providence, R. I...*p. 277*
Metric Metal Works, Erie, Pa.
*NATIONAL METER CO., 299 Broadway, New York, N. Y...*p. 273*
NEPTUNE METER CO. ("Trident"), 50 E. 42nd St., New York, N. Y...*p. 274*
PITTSBURGH METER CO., East Pittsburgh, Pa...*p. 275*
*WORTHINGTON PUMP & MACHINERY CORPN., 115 Broadway, New York, N. Y. ..*pp. 44, 45, 46, 47*

—Oil
Buffalo Meter Co. ("Niagara"), 2917 Main St., Buffalo, N. Y.
*BUILDERS IRON FOUNDRY, Providence, R. I...*p. 277*
*H. S. B. W. COCHRANE CORPN., Philadelphia, Pa...*pp. 146, 147*
*NATIONAL METER CO., 299 Broadway, New York, N. Y...*p. 273*
NEPTUNE METER CO. ("Trident"), 50 E. 42nd St., New York, N. Y...*p. 274*
PITTSBURGH METER CO., East Pittsburgh, Pa...*p. 275*
SIMPLEX VALVE & METER CO., Philadelphia, Pa...*p. 278*
UNION WATER METER CO., Worcester, Mass...*p. 276*
*WORTHINGTON PUMP & MACHINERY CORPN., 115 Broadway, New York, N. Y. ..*pp. 44, 45, 46, 47*
*YARNALL-WARING CO. ("Yarway"), 7603-20 Queen St., Chestnut Hill, Philadelphia, Pa...*p. 196*

—Oxygen and Hydrogen
ELECTROLABS CO., Pittsburgh, Pa...*p. 536*
PITTSBURGH METER CO., E. Pittsburgh, Pa...*p. 275*

—Pitot Tube
*AMERICAN BLOWER CO., Detroit, Mich. ..*p. 553*
*BACHARACH INDUSTRIAL INSTRUMENT CO., Pittsburgh, Pa...*p. 279*
*LOCKETT, A. M. CO., New Orleans, La... *p. 181*
Pitometer Co., 25 Elm St., New York, N. Y.
*PRECISION INSTRUMENT CO., Newark, N. J...*pp. 284, 285*
*REPUBLIC FLOW METERS CO., 2240 Diversey Parkway, Chicago, Ill...*p. 281*
SIMPLEX VALVE & METER CO., Philadelphia, Pa...*p. 278*

—Salt Concentration
Esterline-Angus Co., Indianapolis, Ind.

—Steam
AMERICAN DISTRICT STEAM CO. ("St. John"), North Tonawanda, N. Y...*p. 243*
*BAILEY METER CO. ("Bailey"), 2009 East 46th St., Cleveland, Ohio...*p. 280*
*BUILDERS IRON FOUNDRY, Providence, R. I...*p. 277*
*FOXBORO CO. (Inc.), Foxboro, Mass...*p. 293*

Digitized by Google

Metric Metal Works, Erie, Pa.
*REPUBLIC FLOW METERS CO. (.'Gebhardt''), 2240 Diversey Parkway, Chicago, Ill...*p. 281*
Sargent Steam Meter Co., 820-822 S. Tripp Ave., Chicago, Ill.

—Venturi
*BUILDERS IRON FOUNDRY, Providence, R. I...*p. 277*
*NATIONAL METER CO., 299 Broadway, New York, N. Y...*p. 273*
*PRECISION INSTRUMENT CO., Newark, N. J...*pp. 284, 285*
SIMPLEX VALVE & METER CO., Philadelphia, Pa...*p. 278*

—Water
*BAILEY METER CO. (''Bailey''), 2009 East 46th St., Cleveland, Ohio...*p. 280*
Buffalo Meter Co. (''Niagara''), 2917 Main St., Buffalo, N. Y.
*BUILDERS IRON FOUNDRY, Providence, R. I...*p. 277*
*FOXBORO CO. (Inc.), Foxboro, Mass...*p. 293*
Gamon Meter Co. (''Watch Dog''), 282-296 South St., Newark, N. J.
*H. S. B. W. COCHRANE CORPN., Philadelphia, Pa...*pp. 146, 147*
Hersey Mfg. Co., South Boston, Mass.
Hoppes Mfg. Co., 19 Larch St., Springfield, Ohio
*NATIONAL METER CO., 299 Broadway, New York, N. Y...*p. 273*
NEPTUNE METER CO. (''Trident''), 50 E. 42nd St., New York, N. Y...*p. 274*
PITTSBURGH METER CO., East Pittsburgh, Pa...*p. 275*
*PRECISION INSTRUMENT CO., Newark, N. J...*pp. 284, 285*
*REPUBLIC FLOW METERS CO., 2240 Diversey Parkway, Chicago, Ill...*p. 281*
SIMPLEX VALVE & METER CO., Philadelphia, Pa...*p. 278*
UNION WATER METER CO., Worcester, Mass...*p. 276*
WILLCOX ENGINEERING CO., Saginaw, Mich...*pp. 272, 613*
*WORTHINGTON PUMP & MACHINERY CORPN., 115 Broadway, New York, N. Y. ...*pp. 44, 45, 46, 47*
*YARNALL-WARING CO. (''Yarway''), 7603-20 Queen St., Chestnut Hill, Philadelphia, Pa...*p. 196*

—Watt-Hour
*WESTINGHOUSE ELECTRIC & MFG. CO., East Pittsburgh, Pa...*pp. 160, 161*

MICA
Chicago Mica Co., 110 Campbell St., Valparaiso, Ind.
International Mica Co., Philadelphia, Pa.
*JOHNS-MANVILLE, INC., New York, N. Y. ...*p. 244*
Macallen Co., Boston, Mass.
U. S. Mica Mfg. Co., Montgomery, Ill.

—Electrical Specialties
Chicago Mica Co. (''Mica Bond''), Valparaiso, Ind.

MICROMETERS
Almond, T. R. Mfg. Co., Ashburnham, Mass.
Bath, John & Co. (''Bath Internal''), 8 Grafton St., Worcester, Mass.
Coats Machine Tool Co. (Inc.), 30 Church St., New York, N. Y.
BROWN & SHARPE MFG. CO., Providence, R. I...*p. 277*
*PRECISION INSTRUMENT CO., Newark, N. J...*pp. 284, 285*
Reed Small Tool Works, Worcester, Mass.
Slocomb, J. T. Co., 85 Oxford St., Providence, R. I.
*STARRETT, L. S. CO., Athol, Mass...*p. 508*
Syracuse Twist Drill Co., Syracuse, N. Y.

MICROSCOPES
Eimer & Amend, 205 Third Ave., New York, N. Y.
Holz & Co. (Inc.), 17 Madison Ave., New York, N. Y.

MILK HANDLING MACHINERY
Rutland Mfg. Co. (Inc.), Forest, West & Pine Sts., Rutland, Vt.

MILL BRASSES
LUMEN BEARING CO., Youngstown, Ohio. ...*p. 416*

MILL WEARING PARTS
American Manganese Steel Co., Chicago Heights, Ill.
Chrome Steel Works, Chrome, N. J.
*FULLER-LEHIGH CO., Fullerton, Pa...*p. 128*

MILLING AND DRILLING MACHINES (Combined)
Knight, W. B. Machinery Co., 392 W. Pine St., St. Louis, Mo.
NILES-BEMENT-POND CO., 111 Broadway, New York, N. Y...*p. 470*
Universal Boring Machine Co., Hudson, Mass.

MILLING FIXTURES
INGERSOLL MILLING MACHINE CO., Rockford, Ill...*pp. 478, 479*
KEARNEY & TRECKER CO., Milwaukee, Wis...*p. 480*
Le Blond, R. K., Machine Tool Co., Cincinnati, Ohio
PORTER-CABLE MACHINE CO., Syracuse, N. Y...*p. 460*
Ready Tool Co., Bridgeport, Conn.

MILLING MACHINES
—Automatic
Bilton Machine Tool Co., 555 No. Washington Ave., Bridgeport, Conn.
BROWN & SHARPE MFG. CO., Providence, R. I...*p. 477*
Oesterlein Machine Co., 3301 Colerain Ave., Cincinnati, Ohio
Potter & Johnston Machine Co., Pawtucket, R. I.
PRATT & WHITNEY, 111 Broadway, New York, N. Y...*p. 471*
Rockford Milling Machine Co., Harrison Ave. & 11th St., Rockford, Ill.

—Bench
Ames, B. C. Co., Waltham, Mass.
Burke Machine Tool Co., Conneaut, Ohio
Carter & Hakes Machine Co., Winsted, Conn.
Chicago Machine Tool Co., 647 W. Washington Blvd., Chicago, Ill.
PRATT & WHITNEY CO., 111 Broadway, New York, N. Y...*p. 471*
Sloan & Chace Mfg. Co. (Ltd.), 6th Ave., N. 13th St., Newark, N. J.
Stark Tool Co., 218 Moody St., Waltham, Mass.
Wisconsin Miller Mfg. Co., Sta. A, Milwaukee, Wis.

—Hand
Adams Co., Dubuque, Iowa
BROWN & SHARPE MFG. CO., Providence, R. I...*p. 477*
Carter & Hakes Machine Co., Winsted, Conn.
Chicago Machine Tool Co., 647 W. Washington Blvd., Chicago, Ill.
Davenport Mfg. Co., Meadville, Pa.
*PRATT & WHITNEY CO., 11 Broadway, New York, N. Y...*p. 471*
Standard Engineering Works, Pawtucket, R. I.
U. S. Machine Tool Co., Richmond & McLean Aves., Cincinnati, Ohio

Mi

Digitized by Google

MILLING MACHINES (Continued)
*WHITNEY MFG. CO. (''Whitney''), Hartford, Conn...*p. 495*
Wisconsin Miller Mfg. Co., Sta. A, Milwaukee, Wis.

—Heavy Duty
BROWN & SHARPE MFG. CO., Providence, R. I...*p. 477*
Davenport Mfg. Co., Meadville, Pa.
Gooley & Edlund (Inc.), Cortland, N. Y.
INGERSOLL MILLING MACHINE CO., Rockford, Ill...*pp. 478, 479*
KEARNEY & TRECKER CO., Milwaukee, Wis...*p. 480*
NILES-BEMENT-POND CO., 111 Broadway, New York, N. Y...*p. 470*

—Keyseat
Mitts & Merrill, 816 S. Franklin St., Saginaw, Mich.
National Machine Tool Co., 2272 Spring Grove Ave., Cincinnati, Ohio
NILES-BEMENT-POND CO., 111 Broadway, New York, N. Y...*p. 470*
*WHITNEY MFG. CO. (''Whitney''), Hartford, Conn...*p. 495*

—Manufacturing
Beaman & Smith Co., Providence, R. I.
Becker Milling Machine Co., 53 Franklin St., Boston, Mass.
Gooley & Edlund (Inc.), Cortland, N. Y.
KEARNEY & TRECKER CO., Milwaukee, Wis...*p. 480*
KEMPSMITH MFG. CO., Milwaukee, Wis. *p. 481*
NILES-BEMENT-POND CO., 111 Broadway, New York, N. Y...*p. 470*
*WHITNEY MFG. CO. (''Whitney''), Hartford, Conn...*p. 495*

—Multiple Spindle
INGERSOLL MILLING MACHINE CO., Rockford, Ill...*pp. 478, 479*

—Plain
American Milling Machine Co., Richmond and McLean Ave., Cincinnati, Ohio
BROWN & SHARPE MFG. CO., Providence, R. I...*p. 477*
Cook, Asa S. Co., Hartford, Conn.
Craftsman Tool Co., Conneaut, Ohio
Davenport Mfg. Co., Meadville, Pa.
Dow Mfg. Co., Braintree, Mass.
Garvin Machine Co., Spring & Varick Sts., New York, N. Y.
Gooley & Edlund (Inc.), Cortland, N. Y.
Hendey Machine Co., Torrington, Conn.
KEARNEY & TRECKER CO., Milwaukee, Wis...*p. 480*
KEMPSMITH MFG. CO., Milwaukee, Wis. *p. 481*
NILES-BEMENT-POND CO., 111 Broadway, New York, N. Y...*p. 470*
Oesterlein Machine Co., 3301 Colerain Ave., Cincinnati, Ohio
Standard Engineering Works, Pawtucket, R. I.
Steptoe, John Co., Stock Yards Station, Cincinnati, Ohio
Valley City Machine Works, 12-16 Campau Ave., Grand Rapids, Mich.
*WARNER & SWASEY CO., Cleveland, Ohio...*pp. 456, 457*

—Portable
Pedrick Tool & Machine Co., 3642 N. Lawrence St., Philadelphia, Pa.
Rooksby, E. J. & Co., 1042 Ridge Ave., Philadelphia, Pa.

—Rod
INGERSOLL MILLING MACHINE CO., Rockford, Ill...*pp. 478, 479*

—Thread
Gray Machine Tool Co. (Inc.), 2651 Main St., Buffalo, N. Y.
Hall Planetary Thread Milling Machine Co. (''Planetary''), 4821-31 Garden St., Bridesburg, Philadelphia, Pa.
Lees-Bradner Co., 6210 Carnegie Ave., Cleveland, Ohio
*PRATT & WHITNEY CO., 111 Broadway, New York, N. Y...*p. 471*
SMALLEY GENERAL CO. (Inc.), Bay City, Mich...*p. 482*
Taft-Peirce Mfg. Co., Woonsocket, R. I.
Waltham Machine Works, Waltham, Mass.

—Universal
American Milling Machine Co., Richmond and McLean Ave., Cincinnati, Ohio
BROWN & SHARPE MFG. CO., Providence, R. I...*p. 477*
Garvin Machine Co., Spring & Varick Sts., New York, N. Y.
INGERSOLL MILLING MACHINE CO., Rockford, Ill...*pp. 478, 479*
KEARNEY & TRECKER CO., Milwaukee, Wis...*p. 480*
KEMPSMITH MFG. CO., Milwaukee, Wis. *p. 481*
Knight, W. B. Machinery Co., 392 W. Pine St., St. Louis, Mo.
Newton Machine Tool Works (Inc.), 23rd & Vine Sts., Philadelphia, Pa.
NILES-BEMENT-POND CO., 111 Broadway, New York, N. Y...*p. 470*
Oesterlein Machine Co., 3301 Colerain Ave., Cincinnati, Ohio
Van Norman Machine Tool Co., Springfield, Mass.

—Vertical
BROWN & SHARPE MFG. CO., Providence, R. I...*p. 477*
Cincinnati Milling Machine Co., Cincinnati, Ohio
Cochrane-Bly Co. (''Duplex''), 15 St. James Place, Rochester, N. Y.
KEARNEY & TRECKER CO., Milwaukee, Wis...*p. 480*
KEMPSMITH MFG. CO., Milwaukee, Wis. ..*p. 481*
Knight, W. B. Machinery Co., 392 W. Pine St., St. Louis, Mo.
NILES-BEMENT-POND CO., 111 Broadway, New York, N. Y...*p. 470*
Taylor & Fenn Co., Hartford, Conn.
Toledo Milling Machine Co., Toledo, Ohio

MILLS

—Attrition
Bauer Bros. Co., Springfield, Ohio
*BROWN, A. & F. CO., 79 Barclay St., New York, N. Y...*p. 303*
BUCKEYE IRON & BRASS WORKS, Dayton, Ohio...*p. 168*
Munson Mill Machinery Co. (Inc.), 405 Broadway, Utica, N. Y.

—Ball
Abbe, Paul O. (Inc.), 30 Broad St., New York, N. Y.
*ALLIS-CHALMERS MFG. CO., Milwaukee, Wis...*pp. 28, 29*
BARTLETT, C. O. & SNOW CO., Cleveland, Ohio...*p. 367*
BONNOT CO., Canton, Ohio...*p. 598*
Braddock Mfg. Co., Braddock, Pa.
Chalmers & Williams, Chicago Heights, Ill.
*FULLER-LEHIGH CO., Fullerton, Pa...*p. 128*
Hardinge Conical Mill Co., 120 Broadway, New York, N. Y.
*SMIDTH, F. L. & CO., 50 Church St., New York, N. Y...*p. 604*
*WORTHINGTON PUMP & MACHINERY CORP'N, 115 Broadway, New York, N. Y. *pp. 44, 45, 46, 47*

Digitized by Google

—Cinder
DAYTON-DOWD CO., Quincy, Ill...*p. 566*
Eastern Machinery Co., New Haven, Conn.
Illinois Mfg. & Supply Co., Quincy, Ill.

—Cinder (Tumbling)
Sly, W. W. Mfg. Co., Cleveland, Ohio

—Comminuting
SMIDTH, F. L. & CO., 50 Church St., New York, N. Y...*p. 604*

—Crushing (Sugar Cane)
FULTON IRON WORKS CO., St. Louis, Mo...*p. 87*
HOOVEN-OWENS-RENTSCHLER CO., Hamilton, Ohio..*p. 10*
Reading Iron Co., Reading, Pa.

—End
Bridgeport Cutter Wks. (Inc.), 50 Reamer St., Bridgeport, Conn.
CLEVELAND TWIST DRILL CO., Cleveland, Ohio..*p. 502*
Gale-Sawyer Co., 36 Oliver St., Boston, Mass.

—Grinding
*BROWN, A. & F. CO., 79 Barclay St., New York, N. Y...*p. 303*
*FULLER-LEHIGH CO., Fullerton, Pa...*p. 128*
*SMIDTH, F. L. & CO., 50 Church St., New York, N. Y...*p. 604*
UNION ENGINEERING CO., Cuyahoga & W. 4th St., Cleveland, Ohio..*p. 645*

—Pebble
Abbe, Paul O. (Inc.), 30 Broad St., New York, N. Y.
BARTLETT, C. O. & SNOW CO., Cleveland, Ohio..*p. 367*
Hardinge Conical Mill Co., 120 Broadway, New York, N. Y.
Patterson Foundry & Machine Co., East Liverpool, Ohio

—Roller
*FULLER-LEHIGH CO., Fullerton, Pa...*p. 128*

—Rubber Working
Allen Machine Co., Erie, Pa.

—Sand (Steel Foundry)
FROST MFG. CO., 112 W. Adams St., Chicago, Ill...*pp. 68, 634*

—Tube
*ALLIS-CHALMERS MFG. CO., Milwaukee, Wis...*pp. 28, 29*
BONNOT CO. Canton, Ohio..*p. 598*
*FULLER-LEHIGH CO., Fullerton, Pa...*p. 128*
*SMIDTH, F. L. & CO., 50 Church St., New York, N. Y...*p. 604*
*WORTHINGTON PUMP & MACHINERY CORP'N, 115 Broadway, New York, N. Y. ..*pp. 44, 45, 46, 47*

—Tumbling (Foundry)
DAYTON-DOWD CO. ("Reliable"), Quincy, Ill...*p. 566*

MINERAL WOOL
Banner Rock Products Co. ("Rock Wool Quilt"), Alexandria, Ind.
Insulating Products Co., 1601 Fulford St., Kalamazoo, Mich.
Keasbey, Robert A. Co., 445 West St., New York, N. Y.

MINING AND CONCENTRATING MACHINERY
*ALLIS-CHALMERS MFG. CO., Milwaukee, Wis...*pp. 28, 29*
Stearns-Roger Mfg. Co., 1718-1720 California St., Denver, Colo.

MINING MACHINERY
*ALLIS-CHALMERS MFG. CO., Milwaukee, Wis...*pp. 28, 29*
Angels Iron Works, Angels Camp, Cal.
Box, Wm. A. Iron Works Co., 33rd & Blake Sts., Denver, Colo.
Bretting, C. G. Mfg. Co., Ashland, Wis.
Exeter Machine Works, Pittston, Pa.
FAIRBANKS CO., 416 Broome St., New York, N. Y...*pp. 174, 175*
Hallidie Co., N. 702 Division St., Spokane, Wash.
*HENDRICK MFG. CO., Carbondale, Pa...*p. 653*
*INGERSOLL-RAND CO. ("New Ingersoll," "Radiatax"), 11 Broadway, New York, N. Y...*pp. 546, 547*
JEFFREY MFG. CO., 904 N. 4th St., Columbus, Ohio..*pp. 376, 377*
Lake Shore Engine Works, Marquette, Mich.
Litchfield Foundry & Machine Co., Litchfield, Ill.
Mancha Storage Battery Locomotive Co., 1909 S. Kingshighway, St. Louis, Mo.
Mecklenburg Iron Works, Charlotte, N. C.
Myers Whaley Co. (Inc.), Knoxville, Tenn.
Nelsonville Foundry & Machine Co., Nelsonville, Ohio
POOLE ENGINEERING & MACHINE CO., Woodberry, Baltimore, Md...*pp. 316, 317*
Price, G. W. Pump & Engine Co., 33 Stevenson St., San Francisco, Cal.
Standard Diamond Drill Co., 745 First National Bank Bldg., Chicago, Ill.
Stedman's Foundry & Machine Works, Aurora, Ind.
STURTEVANT MILL COO., Harrison Sq., Boston (22), Mass...*pp. 600, 601*
SULLIVAN MACHINERY CO., 120 S. Michigan Ave., Chicago, Ill...*p. 549*
Superior Iron Works Co., Superior, Wis.
UNION ENGINEERING CO., Cleveland, Ohio *p. 645*
Wellman-Seaver-Morgan Co., Cleveland, Ohio
*WORTHINGTON PUMP & MACHINERY CORP'N, 115 Broadway, New York, N. Y. *pp. 44, 45, 46, 47*

—Hydraulic
NEW YORK ENGINEERING CO., 2 Rector St., New York, N. Y...*p. 82*

—Zinc
United Iron Works (Inc.), 301 Ridge Arcade Bldg., Kansas City, Mo.

MIXERS

—Clay, Fertilizer, etc.
BARTLETT, C. O. & SNOW CO., Cleveland, Ohio..*p. 367*
Ransome Concrete Machinery Co., Dunellen, N. J.
STURTEVANT MILL CO., Harrison Sq., Boston (22), Mass...*pp. 600, 601*
Walker & Ellicott, Wilmington, Del.
WELLER MFG. CO., 1820-1856 N. Kostner Ave., Chicago, Ill.....*p. 381*
WILLIAMS PATENT CRUSHER & PULVERIZER CO, St. Louis, Mo...*pp. 602, 603*

—Color
*BROWN, A. & F. CO., 79 Barclay St., New York, N. Y...*p. 303*

—Concrete
Austin, F. C. Co. (Inc.), ("Austin"), Railway Exchange Bldg., Chicago, Ill.
CONVEYING WEIGHING CO., 90 West St., New York, N. Y...*p. 371*
Ideal Concrete Machinery Co., Colerain Ave., Cincinnati, Ohio
Kent Machine Co., Kent, Ohio
Knickerbocker Co., Jackson, Mich.
Ransome Concrete Machinery Co., Dunellen, N. J.
Shannon, J. Jacob & Co., 1744 Market St., Philadelphia, Pa.

Mi

Digitized by Google

MIXERS (Continued)
Smith, T. L. Co., 470 Old Colony Bldg., Chicago, Ill.
Standard Scale & Supply Co. (''Standard''), 1631 Liberty Ave., Pittsburgh, Pa.
Turner Mfg. Co., Port Washington, Wis.
United Engine Co., Lansing, Mich.

—Hot and Cold Water
*POWERS REGULATOR CO., 995 Architects Bldg., New York, N. Y...*pp. 222, 223*

—Paint
BARTLETT, C. O. & SNOW, Cleveland, Ohio ..*p. 367*
NEWBURGH STEAM BOILER WORKS, (P. Delany & Co.), Newburgh, N. Y...*p. 164*
UNION ENGINEERING CO., Cleveland, Ohio..*p. 645*

—Rubber
BIGGS BOILER WORKS CO., Case Ave. & Newton St., Akron, Ohio..*p. 650*

—Rubber Cement
AMERICAN TOOL & MACHINE CO., Boston, Mass...*p. 614*

—Soap Powder
Dunning & Boschert Press Co. (Inc.), 329 W. Water St., Syracuse. N. Y.

—Steam Jacketed
BARTLETT, C. O. & SNOW CO., Cleveland, Ohio..*p. 367*
*CALDWELL, H. W. & SON CO., 17th St. & Western Ave., Chicago, Ill...*p. 370*
LEBANON BOILER WORKS (J. K. Petty & Co., Inc.), 6 So. 15th St., Philadelphia, Pa...*pp. 78, 79*
NEWBURGH STEAM BOILER WORKS, (P. Delany & Co.), Newburgh, N. Y...*p. 64*
Sowers Mfg. Co., 1300 Niagara St., Buffalo, N. Y.

MIXING MACHINERY
BARTLETT, C. O. & SNOW CO., Cleveland, Ohio..*p. 367*
East Iron & Machine Co., Lima, Ohio
Lovewell-Henrici Co., Chelsea, Mass.
Provost Engineering Corp'n, 50 Church St., New York, N. Y.
Ross, Chas. & Son Co., 148-156 Classon Ave., Brooklyn N. Y.
STANDARD SAND & MACHINE CO., Cleveland, Ohio..*p. 635*
Stedman's Foundry & Machine Works, Aurora, Ill.
STURTEVANT MILL CO., Harrison Sq., Boston, 22, Mass...*pp. 600, 601*
UNION ENGINEERING CO., Cleveland, Ohio *p. 645*
WELLER MFG. CO., 1820-1856 N. Kostner Ave., Chicago, Ill...*p. 381*

—Foundry Sand
BARTLETT, C. O. & SNOW CO., Cleveland, Ohio..*p. 367*
Dunning & Boschert Press Co. (Inc.), 329 W. Water St., Syracuse, N. Y.
*FALLS CLUTCH & MACHINERY CO., Cuyanoga Falls, Ohio..*p. 330*
National Engineering Co., 549 W. Washington Blvd., Chicago, Ill.
Sand Mixing Machine Co., 52 Vanderbilt Ave., New York, N. Y.
STANDARD SAND & MACHINE CO., 5151 St. Clair Ave., Cleveland, Ohio..*p. 635*

—Gas and Air
Eclipse Fuel Engineering Co., Rockford, Ill.
Kemp, C. M. Mfg. Co., 405 E. Oliver St., Baltimore, Md.

MIXING TANKS (Glass Lined)
Pfaudler Co., 217 Cutler Bldg., Rochester, N. Y.

MODELS
BURROUGHS, CHARLES CO. (The), Newark, N. J...*p. 590*

MOLDING & SHAPING MACHINES (Wood)
Whitney, Baxter D. & Son (Inc.), Winchendon, Mass.

MOLDING MACHINES
Adams Co., Dubuque, Iowa.
American Foundry Equipment Co., 366 Madison Ave., New York, N. Y.
Arcade Mfg. Co., Freeport, Ill.
B. & B. Mfg. Co., P. O. Box 974, Indianapolis, Ind.
Berkshire Mfg. Co., 1101 Power Ave., Cleveland, Ohio
CHARLES BURROUGHS CO. (The), Newark, N. J...*p. 590*
Champion Foundry & Mach. Co., 2419 W. 14th St., Chicago, Ill.
Dayton Molding Machine Co., Dayton, Ohio
Federal Malleable Co. (''Rapid), West Allis, Wis.
Grimes Molding Machine Co., 5738 Hastings St., Detroit, Mich.
Hanna Engineering Works (''Mumford''), 1765 Elston Ave., Chicago, Ill.
Herman Pneumatic Machine Co., Pittsburgh, Pa.
International Molding Machine Co., 2608-2624 W. Sixteenth St., Chicago, Ill.
Nicholls, Wm. H. Co., 2-10 College Place, Brooklyn, N. Y.
Osborn Mfg. Co. (''Osborn''), 5401 Hamilton Ave., Cleveland, Ohio
Tabor Mfg. Co., 18th & Hamilton Sts., Philadelphia, Pa.
U. S. Molding Machine Co., 968 E. 69th Place, Cleveland, Ohio

—Hand and Power Rammed Rollover
Grimes Molding Machine Co., 5738 Hastings St., Detroit, Mich.

MOLDS
—Bottle
KELLER MECHANICAL ENGRAVING CO., 68 Washington St., Brooklyn, N. Y...*p. 493*

—Ingot
Akron Gear & Engineering Co., Akron, Ohio
Blairsville Iron Works, Blairsville, Pa.

—Ingot (With Vacuum Chamber)
Peyton & Hitt, 426 W. 3rd St., Elyria, Ohio

—Plastic Composition
BURROUGHS, CHARLES CO. (The), Newark, N. J...*p. 590*
KELLER MECHANICAL ENGRAVING CO., 68 Washington St., Brooklyn, N. Y...*p. 493*

—Rubber
Akron Gear & Engineering Co., 44 E. South St., Akron, Ohio
Goshen Rubber & Mfg. Co., Goshen, Ind.
Hintz Mfg. Co., 1100-1110 S. Kilbourn Ave., Chicago, Ill.
HOGGSON & PETTIS MFG. CO., New Haven, Conn...*pp. 512, 513, 514*

MONEL METAL
GEUDER, PAESCHKE & FREY CO., Western Valley, Milwaukee, Wis...*p. 434*
Hungerford, U. T. Brass & Copper Co., 80 Lafayette St., New York, N. Y.
International Nickel Co., 67 Wall St., New York, N. Y.
Supplee-Biddle Hardware Co., 512 Commerce St., Philadelphia, Pa.

MONO-RAIL SYSTEMS
(See Tramrail Systems, Overhead)

MORTISING MACHINES
Greenlee Bros. & Co., Rockford, Ill.

—Chain Saw
NEW BRITAIN MACHINE CO., New Britain, Conn...*p. 463*

Digitized by Google

MOTION RECORDERS
*BRISTOL CO., Waterbury, Conn...*p. 291*
*FOXBORO CO. (Inc.), Foxboro, Mass...*p. 293*

MOTOR GENERATORS
Crocker-Wheeler Co., Ampere, N. J.
Cushman Electric Co., 43 S. Main St., Concord, N. H.
*GENERAL ELECTRIC CO., Schenectady, N. Y...*pp. 18, 19, 20, 21*
Ridgway Dynamo & Engine Co., Ridgway, Pa.
*WESTINGHOUSE ELECTRIC & MFG. CO., East Pittsburgh, Pa...*pp. 160, 161*

MOTORS

—Aeronautical
Hall-Scott Motor Car Co. (Inc.), Crocker Bldg., San Francisco, Cal.
Roberts Motor Mfg. Co., Sandusky, Ohio
Steel Products Engineering Co., Springfield, Ohio
Thomas-Morse Aircraft Corp'n, Ithaca, N. Y.
Wright-Martin Aircraft Co. New Brunswick, N. J.

—Air and Steam
Union Machine Co., 183 University Ave., St. Paul, Minn.

—Automobile
Consolidated Utilities Corp'n, 730 S. Michigan St., Chicago, Ill.
Fisher Electrical Works, Detroit, Mich.
Hercules Motor Mfg. Co., Canton, Ohio
Herschell-Spillman Co., North Tonawanda, N. Y.
Light Mfg. & Foundry Co., Pottstown, Pa.
Lycoming Motors Corp'n, Williamsport, Pa.
Rochester Motors Co. (Inc.), Rochester, N. Y.
Root & Van Dervoort Engineering Co., East Moline, Ill.
Teetor-Hartley Motor Corp'n, Hagerstown, Ind.
*WESTINGHOUSE ELECTRIC & MFG. CO., East Pittsburgh, Pa...*pp. 160, 161*

—Compressed Air
CHICAGO PNEUMATIC TOOL CO. ("Little Giant"), 6 E. 44th St., New York, N. Y *p. 548*
Detroit Hoist & Machine Co., 8201 Morrow St., Detroit, Mich.
*INGERSOLL-RAND CO. ("Little David"). 11 Broadway, New York, N. Y...*pp. 546, 547*

—Electric
*ALLIS-CHALMERS MFG. CO., Milwaukee, Wis...*p. 28, 29*
Burke Electric Co., Erie, Pa.
Clark, Jas. Jr. Electric Co., 520 W. Main St., Louisville, Ky.
Cliné Electric Mfg. Co., Fisher Bldg., Chicago, Ill.
Colonial Fan & Motor Co., Warren, Ohio
Crocker-Wheeler Co., Ampere, N. J.
Cushman Electric Co., 43 S. Main St., Concord, N. H.
Diehl Mfg. Co., Elizabethport, N. J.
Eck Dynamo & Motor Co., Belleville, N. J.
Electric Machinery Mfg. Co., Minneapolis, Minn.
Electro-Dynamic Co., Bayonne, N. J.
ENGBERG'S ELECTRIC & MECHANICAL WORKS, 18 Vine St., St. Joseph, Mich... *pp. 6, 7*
FAIRBANKS, MORSE & CO., 900 S. Wabash Ave., Chicago, Ill...*p. 41*
Fidelity Electric Co., 331 N. Arch St., Lancaster, Pa.
*GENERAL ELECTRIC CO., Schenectady, N. Y...*pp. 18, 19, 20, 21*
Gillespie Eden Corporation Motor Division, Paterson, N. J.
Holt Electric Co., 377-379 S. Pierce St., Milwaukee, Wis.
Ideal Electric & Mfg. Co., Mansfield, Ohio
Janette Mfg. Co., 556 W. Monroe St., Chicago, Ill.
Kester Electric Co., 420 N. 3rd St. Terre Haute, Ind.
Kimble Electric Co., 634 N. Western Ave. Chicago, Ill.
Lincoln Electric Co., Kelly Ave. & 38th St., Cleveland, Ohio
Mechanical Appliance Co., Milwaukee, Wis.
Norton Machine Works, Elmira, N. Y.
Peerless Electric Co., Warren, Ohio
Phoenix Electric Co., Mansfield, Ohio.
Reliance Electric & Engineering Co., 1088 Ivanhoe Rd., Cleveland, Ohio
Robbins & Myers Co., Springfield, Ohio
Rochester Motors Co. (Inc.), Rochester, N. Y.
Roth Bros. & Co., 1400 W. Adams St., Chicago, Ill.
STURTEVANT, B. F. CO., Hyde Park, Boston, Mass,. *p. 106*
Temco Electric Motor Co., 66 Sugar St., Leipsic, Ohio
Triumph Electric Co. ("Triumph"), 3058 South St., Oakley, Cincinnati, Ohio
Wagner Electric Mfg. Co., 6400 Plymouth Ave., St. Louis, Mo.
Western Electric Co. (Inc.), 195 Broadway, New York, N. Y.
*WESTINGHOUSE ELECTRIC & MFG. CO., East Pittsburgh, Pa...*pp. 160, 161*
Wisconsin Electric Co., Racine, Wis.
Woods, S. A. Machine Co., Boston 27, Mass.
Zobell Electric Motor Corp'n, Garwood, N. J.

—Electric (Slow & Variable Speed)
*ALLIS-CHALMERS MFG. CO., Milwaukee, Wis...*pp. 28, 29*
Electro-Dynamic Co., Bayonne, N. J.
FAIRBANKS, MORSE & CO., 900 S. Wabash Ave., Chicago, Ill. *p. 41*
Jantz & Leist Electric Co., Cincinnati, Ohio
*WESTINGHOUSE ELECTRIC & MFG. CO., East Pittsburgh, Pa...*pp. 160, 161*

—Electric (Small)
Ohio Electric & Controller Co., 5900 Maurice Ave., Cleveland, Ohio
*WESTINGHOUSE ELECTRIC & MFG. CO., East Pittsburgh, Pa...*p. 160, 161*
Zobell Electric Motor Corp'n, Garwood, N. J.

—Electric (Synchronous)
*GENERAL ELECTRIC CO., Schenectady, N. Y...*pp. 18, 19, 20, 21*
Ridgway Dynamo & Engine Co., Ridgway, Pa.
WESTINGHOUSE ELECTRIC & MFG. CO., East Pittsburgh, Pa...*pp. 160, 161*

—Water
Backus Water Motor Co., 172-182 Pennsylvania Ave., Newark, N. J.

MUCKING MACHINERY
Myers-Whaley Co. (Inc.), Knoxville, Tenn.

MUFFLERS
Maxim Silencer Co., 83 Homestead Ave., Hartford, Conn.

MUNITIONS
*BLISS, E. W. CO., Brooklyn, N. Y...*pp. 438, 439*
POOLE ENGINEERING & MACHINE CO., Woodberry, Baltimore, Md...*pp. 316, 317*
Winchester Repeating Arms Co., New Haven, Conn.

N

NAIL MAKING MACHINERY
Cleveland Machine & Mfg. Co., 406 National City Bldg., Cleveland, Ohio
Perkins, Henry Co., Bridgewater, Mass.
Sleeper & Hartley (Inc.), Worcester, Mass.

NICKEL
International Nickel Co., 67 Wall St., New York, N. Y.

Na

Digitized by Google

NIPPLE THREADING MACHINES
*LANDIS MACHINE CO. (Inc.), Waynesboro, Pa...*pp. 496, 497*
Townsend, H. P. Mfg. Co., Hartford, Conn.

NITROGEN GAS
Linde Air Products Co., 30 E. 42nd St., New York, N. Y.

NOTCHING MACHINES

—Angle
Kidder, J. F. Mfg. Co., Burlington, Vt.
NILES-BEMENT-POND CO., 111 Broadway, New York, N. Y...*p. 470*

—Armature Disc
*BLISS, E. W. CO., Brooklyn, N. Y...*pp. 438, 439*
Ferracute Machine Co., Bridgeton, N. J.
NILES-BEMENT-POND CO., 111 Broadway, New York, N. Y...*p. 470*

NOZZLES

—Aerating
ANTHONY CO., 138 West Ave., Long Island City, N. Y...*p. 530*

—Blast
*SCHUTTE & KOERTING CO., 1184 Thompson St., Philadelphia, Pa...*p. 159*

—Fire
*CRANE CO., 836 S. Michigan Ave., Chicago, Ill...*pp. 170, 171, 172, 173*
KELLY & JONES CO., Greensburg, Pa...*pp. 182, 183*
Morse, Andrew J. & Son (Inc.), 221 High St., Boston, Mass.

—Graphite
Seidel, R. B. (Inc.) ("Seidel"), 1322 Callowell St., Philadelphia, Pa.

—Mixing
ANTHONY CO., 138 West Ave., Long Island City, N. Y...*p. 530*
*SPRAY ENGINEERING CO. ("Spraco"), 60 High St., Boston, Mass. *pp. 166, 167*

—Plumbago
Ross Tacony Crucible Co., Tacony, Philadelphia, Pa.

—Spray
ANTHONY CO., 138 West Ave., Long Island City, N. Y...*p. 530*
*COOLING TOWER CO. (Inc)., 15 John St., New York, N. Y...*p. 165*
KELLY & JONES CO., Greensburg, Pa...*pp. 182, 183*
Monarch Mfg. Works, Salmon & Westmoreland Sts., Philadelphia, Pa.
*SCHUTTE & KOERTING CO., 1184 Thompson St., Philadelphia, Pa...*p. 159*
*SPRAY ENGINEERING CO. ("Spraco"), 60 High St., Boston, Mass...*pp. 166, 167*
*YARNELL-WARING CO. ("Yarway"), 7603-20 Queen St., Chestnut Hill, Philadelphia, Pa...*p. 196*

NUT LOCKS
Arghis, E. J., 74 Wall St., New York, N. Y.
DRAKE LOCK NUT CO., E. 75th & Stanton Ave., Cleveland, Ohio..*p. 523*
Grip Nut Co., 5917 S. Western Ave., Chicago, Ill.
Positive Lock Washer Co., Newark, N. J.

NUT MAKING MACHINES
Ajax Mfg. Co., 3830 Lakeside Ave., Cleveland, Ohio
Pawtucket Mfg. Co., 327 Pine St., Pawtucket, R. I.

NUTS
Arghis, E. J., 74 Wall St., New York, N. Y.
AUTOMATIC PRODUCTS CORP'N, 199-203 8th St. Long Island City, N. Y...*p. 518*
Bayonne Bolt & Nut Co., Bayonne, N. J.
Cincinnati Screw Co., Twightwee, Ohio (Cincinnati suburb)
Clark Bros. Bolt Co., Milldale, Conn.
Eastern Bolt & Nut Co., Providence, R. I.
Everitt Co., 261 Franklin St., Boston, Mass.
Falls Rivet Co., Kent, Ohio
Flannery Bolt Co. ("Realock"), Vanadium Bldg., Pittsburgh, Pa.
Grip Nut Co., 5917 S. Western Ave., Chicago, Ill.
Lamson & Sessions Co., Cleveland, Ohio
NATIONAL ACME CO., Cleveland, Ohio..*pp. 464, 465*
National Screw & Tack Co., 7413 Stanton Ave., Cleveland, Ohio
*REED & PRINCE MFG. CO., Worcester, Mass...*p. 524*
Standard Bolt Co., Columbus, Ohio
STANDARD SHOP EQUIPMENT CO., 23rd St. & Hunting Park Ave., Philadelphia, Pa...*p. 515*

—Case Hardened
RUSSELL, BURDSALL & WARD BOLT & NUT CO. ("Empire"), Port Chester, N. Y. *p. 525*
STANDARD SHOP EQUIPMENT CO., 23rd St. & Hunting Park Ave., Philadelphia, Pa. *p. 515*

—Castellated
Columbia Nut Bolt Co. (Inc.), Bridgeport, Conn.
E. C. Manufacturing Co., 546-548 W. Harrison St., Chicago, Ill.
Milton Mfg. Co., Milton, Pa.
New Haven Screw Co., 191 Foster St., New Haven, Conn.
Perry-Fay Co., Elyria, Ohio
RUSSELL, BURDSALL & WARD BOLT & NUT CO. ("Empire"), Port Chester, N. Y. *p. 525*
Standard Turnbuckle Co., Woolworth Bldg., New York, N. Y.
Sherman-Klove Co., 4640 W. Harrison St., Chicago, Ill.
U. S. Automatic Co., Amherst, Ohio
Western Automatic Machine Screw Co., Elyria, Ohio

—Cold Finished
Brightman Mfg. Co., Marion Rd., Columbus, Ohio
Columbia Nut & Bolt Co. (Inc.), Bridgeport, Conn.
COLUMBUS BOLT WORKS CO., Columbus, Ohio..*p. 522*
Garland Mfg. Co., Lawrence Co., West Pittsburgh, Pa.
Milton Mfg. Co., Milton, Pa.
*REED & PRINCE MFG. CO., Worcester, Mass...*p. 524*
RUSSELL, BURDSALL & WARD BOLT & NUT CO. ("Empire"), Port Chester, N. Y...*p. 525*
Safety Nut & Bolt Co, 6528 Carnegie Ave. Cleveland, Ohio

—Hot Pressed
Bourne-Fuller Co., 1422 Euclid Ave., Cleveland, Ohio
COLUMBUS BOLT WORKS CO., Columbus, Ohio ..*p. 522*
Milton Mfg. Co., Milton, Pa.
National Bolt & Nut Co., 62nd St. & A. V. R. R., Pittsburgh, Pa.
Positive Lock Bolt Co., 6528 Carnegie Ave., Cleveland, Ohio
RUSSELL, BURDSALL & WARD BOLT & NUT CO. ("Empire"), Port Chester, N. Y. *p. 525*
STANDARD SHOP EQUIPMENT CO., 23rd St. & Hunting Park Ave., Philadelphia, Pa. *p. 515*

—Lock
American Lock-Nut Co., 122 S. Michigan Ave., Chicago, Ill.
Columbia Nut & Bolt Co. (Inc.) ("Columbia, Gib"), Bridgeport, Conn.

Digitized by Google

DRAKE LOCK NUT CO., E. 75th & Stanton Ave., Cleveland, Ohio...*p. 523*
Grip Nut Co., 5917 S. Western Ave., Chicago, Ill.
Selflock Nut & Bolt Co. (Inc.), East Syracuse, N. Y.

—Semi-Finished
Columbia Nut & Bolt Co. (Inc.), Bridgeport, Conn.
Progressive Mfg. Co., Torrington, Conn.
Rhode Island Tool Co., 148 West River St., Providence, R. I.
RUSSELL-BURDSALL & WARD BOLT & NUT CO. (''Empire''), Port Chester, N. Y. *p. 525*

—Special
*REED & PRINCE MFG. CO., Worcester, Mass. *p. 524*

—Thumb
WILLIAMS, J. H. & CO., 70 Richards St., Brooklyn, N. Y...*p. 517*

O

OHMMETERS
BIDDLE, JAMES G. (''Megger''), 1211-1213 Arch St., Philadelphia, Pa...*p. 298*
Thompson-Levering Co., 325 Arch St., Philadelphia, Pa.
*WESTINGHOUSE ELECTRIC & MFG. CO., East Pittsburgh, Pa...*pp. 160, 161*

OIL BURNERS, ENGINES, FILTERS, PUMP, ETC.
(See Burners, Engines, Filters, Pumps, Etc., Oil)

OIL BURNING EQUIPMENT
ANTHONY CO., 138 West Ave., Long Island City, N. Y...*p. 530*
*BEST, W. N. FURNACE & BURNER CORP'N, 11 Broadway, New York, N. Y. *pp. 130, 531*
Bethlehem Shipbuilding Corp'n (Ltd.), Bethlehem, Pa.
BIGGS BOILER WORKS CO., Case Ave. & Newton St., Akron, Ohio..*p. 650*
CASH, A. W. CO., Decatur, Ill...*p. 205*
Coen Co. (Inc.), 112 Market St., San Francisco, Cal.
Fess System Co., 220 Natoma St., San Francisco, Cal.
Fisher, Alfred Furnace Co., 803 W. Madison St., Chicago, Ill.
Hammel Oil Burning Equipment Co., 12 Pearl St., Boston, Mass.
Improved Equipment Co., 24 State St., New York, N. Y.
Johnson, S. T. Co., 1337 Mission St., San Francisco, Cal.
Lalor Fuel Oil System Co. of Md. (Inc.), 527-33 Colvin St., Baltimore, Md.
*LOCKETT, A. M. & CO., New Orleans, La. *p. 131*
McKneat Manufacturing Co., Easton, Pa.
*MAXON FURNACE & ENGRG. CO., Muncie, Ind...*pp. 532, 533*
National Supply Co., 412 Orleans St., Chicago, Ill.
Peabody Engineering Corp'n, 331 Madison Ave., New York, N. Y.
Ray, W. S. Mfg. Co., 29 Spear St., San Francisco, Cal.
*ROCKWELL, W. S. CO., 50 Church St., New York, N. Y...*p. 529*
Rogers-Higgins Co. (Inc.), 710 Carondelet Bldg., New Orleans, La.
*SCHUTTE & KOERTING CO., 1184 Thompson St., Philadelphia, Pa...*p. 159*
Tate-Jones & Co. (Inc.), Pittsburgh, Pa.
Wayne Oil Tank & Pump Co., 749 Canal St., Fort Wayne, Ind.
*Witt, G. E. Co. (Inc.), 862-64 Howard St., San Francisco, Cal.

OILCLOTH PRINTING MACHINES
Dienelt & Eisenhardt (Inc.), 1304 N. Howard St., Philadelphia, Pa.

OIL CUPS
AMERICAN INJECTOR CO., Detroit, Mich. *p. 217*
Bowen Products Corp'n, Auburn, N. Y.
BUCKEYE IRON & BRASS WORKS, Dayton, Ohio..*p. 168*
*CRANE CO., 836 S. Michigan Ave., Chicago, Ill...*pp. 170, 171, 172, 173*
Crescent Mfg. Co., Scottdale, Pa.
Detroit Lubricator Co., Detroit, Mich.
Engineering Supply Co., 2238 N. 9th St., Philadelphia, Pa.
Essex, G. B. Brass Co., 2000 Franklin St., Detroit, Mich.
Hunter Pressed Steel Co. (''Shurflo''), Pierce & Linden Sts., Lansdale, Pa.
KELLY & JONES CO., Greensburg, Pa...*pp. 182, 183*
LONERGAN, J. E. CO., 211-215 Race St., Philadelphia, Pa...*pp. 203, 389*
*LUNKENHEIMER CO. (''Pioneer'' (''Reserve''), Cincinnati, Ohio..*pp. 184, 185, 186, 187, 188, 189*
Merchant & Evans Co., 2019-2035 Washington Ave., Philadelphia, Pa.
Michigan Lubricator Co., 3643 Beaubien St., Detroit, Mich.
Powell, William Co., 2525 Spring Grove Ave., Cincinnati, Ohio
Rich Mfg. Co., 370 Atlantic Ave., Boston, Mass.
*RICHARDSON-PHENIX CO., 126 Reservoir Ave., Milwaukee, Wis...*pp. 248, 249*
Sherwood Mfg. Co., 1702-1712 Elmwood Ave., Buffalo, N. Y.
*UNITED STATES METALLIC PACKING CO., 429 N. 13th St., Philadelphia, Pa...*p. 257*

OIL FILTERING SYSTEMS
*RICHARDSON-PHENIX CO., 126 Reservoir Ave., Milwaukee, Wis...*pp. 248, 249*
Wayne Oil Tank & Pump Co., 749 Canal St., Fort Wayne, Ind.

—Turbine (Continuous By-Pass)
*RICHARDSON-PHENIX CO., 126 Reservoir Ave., Milwaukee, Wis...*pp. 248, 249*

OIL GROOVERS
Fischer Machine Co. (''Fischer''), 310-316 N. 11th St., Philadelphia, Pa.
Hanson-Whitney Machine Co. (''Zig-Zag''), 169 Bartholomew Ave., Hartford, Conn.
National Machine Tool Co., 2272 Spring Grove Ave., Cincinnati, Ohio

OIL MILL MACHINERY..
Bauer Bros. Co., Springfield, Ohio
BUCKEYE IRON & BRASS WORKS, Dayton, Ohio..*p. 168*
Callahan, W. H. Co., Dayton, Ohio
Carver Cotton Gin Co., East Bridgewater, Mass.
Chickasaw Machine & Foundry Co., Memphis, Tenn.
ELMES, CHAS. F. ENGINEERING WORKS, 215 N. Morgan St., Chicago, Ill...*p. 591*
JEFFREY MFG. CO., 904 N. 4th St., Columbus, Ohio..*pp. 376, 377*
Murray Co., Dallas, Tex.
Sprout, Waldron & Co., Muncy, Pa.
*WORTHINGTON PUMP & MACHINERY CORP'N, 115 Broadway, New York, N. M. *pp. 44, 45, 46, 47*

OIL RECLAIMERS
*DE LA VERGNE MACHINE CO., 1123 E. 138th St., New York, N. Y...*p. 40*

Oi

Digitized by Google

OIL RECLAIMERS (Continued)
*RICHARDSON-PHENIX CO., 126 Reservoir Ave., Milwaukee, Wis...*pp. 248, 249*

OIL REFINERY EQUIPMENT
BIGGS BOILER WORKS CO., Case Ave. & Newton St.. Akron, Ohio..*p. 650*
*CASEY-HEDGES CO., Chattanooga, Tenn. *pp. 60, 61*
Graver Corp'n, 283 Jackson Blvd., East Chicago, Ind.
McAleenan Brothers Co., 25th & R. R. Sts., Pittsburgh, Pa.
NATIONAL SUPPLY CO., Toledo, Ohio..*pp. 648, 649*
Petroleum Iron Works Co., Sharon, Pa.
Reeves Bros. Co., Box K, Alliance, Ohio
Reid, Joseph Gas Engine Co., Oil City, Pa.
Standard Boiler & Plate Iron Co., Niles, Ohio
*TITUSVILLE IRON WORKS CO., Titusville, Pa...*p. 89*
United Iron Works (Inc.), 301 Ridge Arcade Bldg., Kansas City, Mo.
*U. S. CAST IRON PIPE & FOUNDRY CO., Burlington, N. J...*pp. 232, 233*
*VOGT, HENRY MACHINE CO., Louisville, Ky...*pp. 632, 633*
YORK MANUFACTURING CO., York, Pa. ..*p. 631*

OIL SEPARATING MACHINES (Centrifugal)
AMERICAN TOOL & MACHINE CO. ("Roper"), Boston, 9, Mass...*p. 614*
*DE LAVAL STEAM TURBINE CO., Trenton, N. J...*p. 22*
D'Olier Centrifugal Pump & Machine Co., 400 Morris Bldg., Philadelphia, Pa.
National Separator & Machine Co., 789 Boylston St.. Boston, Mass.
OIL & WASTE SAVING MACHINE CO., 1509 Real Estate Trust Bldg., Philadelphia, Pa...*p. 615*

OIL STORAGE OUTFITS
Atlantic Refining Co., 3144 Passyunk Ave., Philadelphia, Pa.
BIGGS BOILER WORKS CO., Case Ave. & Newton St., Akron, Ohio..*p. 650*
Gilbert & Barker Mfg. Co., Springfield, Mass.
*RICHARDSON-PHENIX CO., 126 Reservoir Ave., Milwaukee, Wis...*pp. 248, 249*

OIL STORAGE SYSTEMS
American Oil Pump & Tank Co., Findley & Dalton St., Cincinnati, Ohio
BIGGS BOILER WORKS CO., Case Ave. & Newton St., Akron, Ohio..*p. 650*
Kupferle Bros. Mfg. Co., 600 N. 2nd St., St. Louis, Mo.
LASKER IRON WORKS, 3201 So. Lincoln St., Chicago, Ill...*p. 655*
*RICHARDSON-PHENIX CO., 126 Reservoir Ave., Milwaukee, Wis...*pp. 248, 249*

—Hydro Pneumatic
NEW YORK CENTRAL IRON WORKS CO. (Inc.), North Middlesburg Road, Hagerstown, Md...*p. 659*

—Locomotive Fuel
NATIONAL BOILER WASHING CO. ("National"), Railway Exchange, Chicago, Ill. *p. 145*

OIL TESTING APPARATUS
TAGLIABUE, C. J. MFG. CO., 18-88 33rd St., Brooklyn, N. Y...*p. 296*

OIL TESTING MACHINES
OLSEN, TINIUS TESTING MACHINE CO., 500 N. 12th St., Philadelphia, Pa...*pp. 265, 266, 267*
RIEHLE BROS. TESTING MACHINE CO., 1424 N. 9th St., Philadelphia Pa...*p. 268*
*WESTINGHOUSE ELECTRIC & MFG. CO.. East Pittsburgh, Pa...*pp. 160, 161*

OIL WELL MACHINERY
Armstrong Mfg. Co., Waterloo, Iowa
Bessemer Gas Engine Co., Grove City, Pa.
BROWNELL CO., Dayton, Ohio..*p. 59*
COOK, A. D. (Inc.), Lawrenceburg, Ind...*p. 585*
Lucey Mfg. Corp'n, Woolworth Bldg., New York, N. Y.
NATIONAL SUPPLY CO., Toledo, Ohio..*pp. 648, 649*
Oil Well Supply Co., 213-215 Water St.. Pittsburgh, Pa.
Reid, Joseph Gas Engine Co., Oil City, Pa.
*TITUSVILLE IRON WORKS CO., Titusville, Pa...*p. 89*
Union Tool Co., Torrance, Cal.
*WORTHINGTON PUMP & MACHINERY CORP'N, 115 Broadway, New York. N. Y. *pp. 44, 45, 46, 47*

OIL WELL SUPPLIES
Aelson Machine Co.. P. O. Box 816, Los Angeles, Cal.
Bradford Motor Works, Bradford, Pa..
COOK, A. D. (Inc.), Lawrenceburg, Ind...*p. 585*
JARECKI MFG. CO., Erie, Pa...*pp. 178, 179*
KELLY & JONES CO., Greensburg, Pa...*pp. 182, 183*
Layne & Bowler Co., 6th & Girard Sts., Houston, Tex.
McEwen Brothers, Wellsville, N. Y.
NATIONAL SUPPLY CO., Toledo, Ohio..*pp. 648, 649*
Oil Well Supply Co., 213-215 Water St., Pittsburgh, Pa.
Oscillating Washer Co.. Titusville, Pa.
Pattin Bros., Marietta, Ohio

OILING DEVICES
AMERICAN INJECTOR CO., Detroit, Mich. *p. 217*
*GREENE TWEED & CO. ("Rochester"). 109 Dusne St., New York, N. Y...*p. 250*
Inter-State Machine Products Co.. Rochester, N. Y.
LONERGAN, J. E. CO., 211-215 Race St., Philadelphia, Pa...*pp. 203, 289*
*LUNKENHEIMER CO., Cincinnati, Ohio *pp. 184 185, 186, 187, 188, 189*
McCullough Mfg. Co., 2632-2634 Central Ave., Minneapolis, Minn.
Manzel Bros. Cl. ("Manzel"), 315 Babcock St., Buffalo, N. Y.
Nugent, Wm. W. & Co., 146-148 W. Superior St., Chicago, Ill.
*RICHARDSON-PHENIX CO., 126 Reservoir Ave., Milwaukee, Wis...*pp. 248, 249*
Tucker, W. W. & C. F., 191 Franklin Ave., Hartford, Conn.

OILING SYSTEMS
*LUNKENHEIMER CO., Cincinnati, Ohio... *pp. 184, 185, 186, 187, 188, 189*
Nugent, Wm. W. & Co., 146 148 W. Superior St., Chicago, Ill.
Power Plant Specialties, 219 Ruffner St., Lockland. Ohio
*RICHARDSON-PHENIX CO., 126 Reservoir Ave., Milwaukee, Wis...*pp. 248, 249*

OILS
Black Bear Co., 138-144 Temple St., Long Island City, N. Y.
COOK'S, ADAM SONS, 708-710 Washington St., New York, N. Y...*p. 251*
Crew Levick Co., 111 N. Broad St., Philadelphia, Pa.
Dexter Oil Co., 313 6th Ave., Pittsburgh, Pa.
Gearhart Oil Burner Co., 1314 Eye St., Fresno, Cal.
Kramer, W. J. Oil Co., 214-216 Reed St., Milwaukee, Wis.
Metalene Chemical Co., Cleveland, Ohio
Monarch Mfg. Co., Toledo, Ohio

Digitized by Google

New York Lubricating Oil Co., 116 Broad St., New York, N. Y.
New York & New Jersey Lubricant Co., 165 Broadway, New York.
O'Brien Oil & Chemical Co., St. Louis, Mo.
Ohio Grease Co. (''Ohio''), Loudonville, Ohio
Penn Oil & Supply Co., Oil City, Pa.
Standard Oil Co., 910 S. Michigan Ave., Chicago, Ill.
Star Oil Co., 342 N. Irving Ave., Chicago, Ill.
Sun Co., 1428 S. Penn Sq., Philadelphia, Pa.
Texas Company (The) (''Texaco''), 17 Battery Pl., New York, N. Y.
TIDE WATER OIL CO. (''Veedol''), 11 Broadway, New York, N. Y...*pp. 252, 253*
Waverly Oil Works Co., 54th St., Pittsburgh, Pa.
Wolverine Lubricants Co. of New York (''Wolf's Head Oil''), 44 Whitehall St., New York, N. Y.

—Core
Paige & Jones Chemical Co., 15 E. 40th St., New York, N. Y.
Swan & Finch Co. (''Corul''), 522 5th Ave., New York, N. Y.
Standard Oil Co. of New York, 26 Broadway, New York, N. Y.
Universal Oil Co., 38 Fulton St., New York, N. Y.

—Cutting
Universal Oil Co., 38 Fulton St., New York, N. Y.

—Cutting (Soluble)
White & Bagley Co. (''Economy''), 100 Foster St., Worcester, Mass.

—Fuel
American Oil Products Co., 1426 Seneca St., Buffalo, N. Y.
Indian Refining Co. (Inc.), 244 Madison Ave., New York, N. Y.
Lynch-Clarisey Co., 3211-3213 S. Wood St., Chicago, Ill.
Oil City Oil & Grease Co., Oil City, Pa.
Sloan & Zook, 101 Main St., Bradford, Pa.
TIDE WATER OIL CO., 11 Broadway, New York, N. Y...*pp. 252, 253*
Warner, Quinlan Co., 79 Wall St., New York, N. Y.
White Star Refining Co., 614 Avery Ave., Detroit, Mich.

—Lubricating
Chard & Howe, 256 Front St., New York, N. Y.
COOK'S, ADAM SONS, 708-710 Washington St., New York, N. Y...*p. 251*
Crew Levick Co., 111 Broad St., Philadelphia, Pa.
Dearborn Chemical Co., 323 S. Michigan Ave., Chicago, Ill.
Eagle Oil & Supply Co. (''Eageline''), 44-45-46 India St., Boston, Mass.
Fiske Bros. Refining Co., 24 State St., New York, N. Y.
Franklin Oil & Gas Co., Bedford, Ohio
Gulf Refining Co., Pittsburgh, Pa.
Harris, A. W. Oil Co., 326 S. Water St., Providence, R. I.
Ilsley-Doubleday & Co., 229-231 Front St., New York, N. Y.
Kellogg, E. H. & Co., 243-244 South St., New York, N. Y.
Keystone Oil & Mfg. Co., 111 N. Market St., Chicago, Ill.
Moore Oil Co., York St. & McLean Ave., Cincinnati, Ohio
Oil City Oil & Grease Co., Oil City, Pa.
Robinson, Wm. C. & Son Co., 32 South St., Baltimore, Md.
Sloan & Zook, 101 Main St., Bradford, Pa.
Sun Co., 1428 S. Penn Sq., Philadelphia, Pa.
TIDE WATER OIL CO. (''Veedol''), 11 Broadway, New York, N. Y...*pp. 252, 253*
Vacuum Oil Co., 61 Broadway, New York, N. Y.
Valvoline Oil Co., 60 Broadway, New York, N. Y.
Warner-Quinlan Co., 79 Wall St., New York, N. Y.
White & Bagley Co. (''Oilzum''), 100 Foster St., Worcester, Mass.
Wolverine Lubricants Co. of N. Y. (''Wolf's Head Oil''), 44 Whitehall St., New York, N. Y.

—Quenching
Bell & Gossett Co., 117 N. Dearborn St., Chicago, Ill.
Robinson, Wm. C. & Son Co., 23 South St., Baltimore, Md.
Stuart, D. A. & Co., 350-360 E. Illinois St., Chicago, Ill.

OPERATION RECORDERS
*BRISTOL CO., Waterbury Conn...*p. 291*
BROWN INSTRUMENT CO. (''Brown''), Philadelphia, Pa...*p. 292*
*FOXBORO CO. (Inc.), Foxboro, Mass...*p. 293*

OPTICAL PYROMETERS
(See Pyrometers, Optical)

ORE CONCENTRATING MACHINES
*ALLIS-CHALMERS MFG. CO., Milwaukee, Wis...*pp. 28, 29*
Denver Engineering Works Co., 30th & Blake Sts., Denver, Colo.

ORE DRESSING MACHINERY
*ALLIS-CHALMERS MFG. CO., Milwaukee, Wis...*pp. 28, 29*

ORE HANDLING MACHINERY
Andresen-Evans Co., 646 Railway Exchange Bldg., Chicago, Ill.
BARTLETT, C. O. & SNOW CO., Cleveland, Ohio...*p. 367*
*BROWN HOISTING MACHINERY CO., Cleveland, Ohio..*p. 390*
Hoover & Mason, 1407 Railway Exchange, Chicago, Ill.
HUNT, C. W. CO. (Inc.), West New Brighton, Staten Island, N. Y...*pp. 374, 375*
JEFFREY MFG. CO., 904 N. 4th St., Columbus, Ohio..*pp. 376, 377*
Lakeside Bridge & Steel Co. (''Labride''), 404 Villard Ave., North Milwaukee, Wis.
Mead-Morrison Mfg. Co., Prescott & Orleans Sts., East Boston, Mass.
ROBINS CONVEYING BELT CO., Park Row Bldg., New York, N. Y...*p. 373*
Stephens-Adamson Mfg. Co., Aurora, Ill.
STURTEVANT MILL CO., Harrison Sq., Boston, 22, Mass...*pp. 600, 601*
WELLER MFG. CO., 1820-1856 N. Kostner Ave., Chicago, Ill...*p. 381*

ORE JIGS
McLanahan-Stone Machine Co., Hollidaysburg, Pa.

ORE MILLING MACHINERY
Colorado Iron Works Co., Box 989, Denver, Colo.

ORE WASHING MACHINERY
Davis Foundry & Machine Works, Rome, Ga.
McLanahan Stone Machine Co., Hollidaysburg, Pa.

ORNAMENTAL WORK

—Brass
Newman Mfg. Co., 717 Sycamore St., Cincinnati, Ohio
Sterling Specialty Co., Newcomerstown, Ohio

—Iron and Bronze
Buffalo Wire Works Co., 540 Terrace, Buffalo, N. Y.

Or

Digitized by Google

ORNAMENTAL WORK (Continued)
Kamman, Walter Mfg. Co., 3264 Spring Grove Ave., Cincinnati, Ohio
Schrieber, L. & Sons Co., P. O. Box 18, Evanston Sta., Cincinnati, Ohio

OUTFITS: *See*
Air Compressor
Battery Charging
Flexible Shaft
Gasoline Storage
Oil Storage
Pumping

OVENS
AMERICAN GAS FURNACE CO., Elizabeth, N. J...*p. 527*
KOVEN, L. O. & BROTHER, 154 Ogden Ave., Jersey City, N. J...*p. 605*

—Conveyor
OVEN EQUIPMENT & MFG. CO. (''Crawfords Sectional''), New Haven, Conn...*p. 534*
Young Bros. Co., 6528 Mack Ave., Detroit, Mich.

—Core
AMERICAN INDUSTRIAL FURNACE CORP'N, 10 Post Office Sq., Boston, Mass. *p. 528*
*CARRIER ENGINEERING CORP'N, 39 Cortlandt St., New York, N. Y...*p. 620*
Foundry Equipment Co., 1831 Columbia Rd., Cleveland, Ohio
Gehnrich Indirect Heat Oven Co. (Inc.), Long Island City, N. Y.
KOVEN, L. O. & BROTHER, 154 Ogden Ave., Jersey City, N. J...*p. 605*
Ludlum Electric Furnace Corp'n, Watervliet, N. Y.
Moyer, Albert W., Singer Bldg., New York, N. Y.
Ohio Body Blower Co., 9300 Detroit Ave., Cleveland, Ohio
OVEN EQUIPMENT & MFG. CO., New Haven, Conn...*p. 534*
Sly, W. W. Mfg. Co., Cleveland, Ohio
Steiner, E. E. & Co. (Inc.), 2-16 Ave. C., Newark, N. J.
Young Brothers Co., 6528 Mack Ave., Detroit, Mich.

—Enameling
AMERICAN INDUSTRIAL FURNACE CORP'N., 10 Post Office Sq., Boston, Mass. *p. 528*
*CARRIER ENGINEERING CORP'N, 39 Cortlandt St., New York, N. Y...*p. 620*
Gehnrich Indirect Heat Oven Co. (Inc.), Long Island City, N. Y.
OVEN EQUIPMENT & MFG. CO., New Haven, Conn...*p. 534*
Steiner, E. E. & Co. (Inc.), 2-16 Ave. C., Newark, N. J.
Young Brothers Co., 6528 Mack Ave., Detroit, Mich.

—Japaning
AMERICAN INDUSTRIAL FURNACE CORP'N, 10 Post Office Sq., Boston, Mass. *p. 528*
Gehnrich Indirect Heat Oven Co. (Inc.), Long Island City, N. Y.
Monarch Engineering & Mfg. Co., 1206 American Bldg., Baltimore, Md.
OVEN EQUIPMENT & MFG. CO., New Haven, Conn...*p. 534*
Steiner, E. E. & Co. (Inc.), 2-16 Ave. C., Newark, N. J.
Welded Steel Barrel Corp'n., Leib & Wight Sts., Detroit, Mich.
Young Bros. Co., 666 Mack Ave., Detroit, Mich.

—Sectional
OVEN EQUIPMENT & MFG. CO., New Haven, Conn...*p. 534*

—Sherardizing (Electric)
*GENERAL ELECTRIC CO., Schenectady, N. Y...*pp. 18, 19, 20, 21*

—Sulpher
Carthage Machine Co. (''Digester''), Carthage, N. Y.

—Vulcanizing
BIGGS BOILER WORKS CO., Case Ave. & Newton St., Akron, Ohio..*p. 650*
OVEN EQUIPMENT & MFG. CO., New Haven, Conn...*p. 534*

OVERHAULING MACHINES
POOLE ENGINEERING & MACHINE CO., Woodberry, Baltimore, Md...*pp. 316, 317*
TORRINGTON MFG. CO., Torrington, Conn. *p. 641*

OVERHEAD TRACK SYSTEMS
(See Tramrail Systems, Overhead)

OXY-ACETYLENE APPARATUS
BASTIAN-BLESSING CO. (''Rego''), 125 W. Austin Ave., Chicago, Ill...*p. 539*
Davis-Bournonville Co., Jersey City, N. J.
ELECTROLABS CO., Pittsburgh, Pa...*p. 536*
Henderson-Willis Welding & Cutting Co., 2305-07-09 N. 11th St., St. Louis, Mo.
K-G Welding & Cutting Co. (Inc.), 556 W. 34th St., New York, N. Y.
MILBURN, ALEXANDER CO. (The), Baltimore, Md...*p. 540*
Modern Engineering Co., 23rd & Walnut Sts., St. Louis, Mo.
Waterhouse Welding Co., 15 Pelham St., Boston, Mass.

OXY-ACETYLENE SUPPLIES
Modern Engineering Co., 23rd & Walnut Sts., St. Louis, Mo.
Waterhouse Welding Co., 15 Pelham St., Boston, Mass.

OXY-ACETYLENE WELDING
(See Welding, Oxy-Acetylene)

OXYGEN GAS
Air Reduction Co. (Inc.), 342 Madison Ave., New York, N. Y.
Burdett Mfg. Co., 309 St. James Court, Chicago, Ill.
ELECTROLABS CO., Pittsburgh, Pa...*p. 536*
Linde Air Products Co., 30 E. 42nd St., New York, N. Y.
Metals Welding Co., 4400 Perkins Ave., Cleveland, Ohio
National Oxygen Co., 14 E. Harrison St., Chicago, Ill.

—Electrolytic
ELECTROLABS CO., Pittsburgh, Pa...*p. 536*
International Oxygen Co., 796 Frelinghuysen Ave., Newark, N. J.

OXYGEN-HYDROGEN GENERATING EQUIPMENT
National Oxygen Co., 14 E. Harrison St., Chicago, Ill.
Oxygen Products Co., 2525 Liberty Ave., Pittsburgh, Pa.

OXYGEN TESTING APPARATUS
ELECTROLABS CO., Pittsburgh, Pa...*p. 536*

P

PACKAGING MACHINERY
National Packaging Machinery Co., 174 Green St., Jamaica Plain, Boston, Mass.

PACKING

—Ammonia
American Huhn Metallic Packing Co., Woolworth Bldg., New York, N. Y.
Brandt, Randolph, 66 Cortlandt St., New York, N. Y.

Digitized by Google

Clark Flexible Metalic Packing Co., 59-67 Kennebec St., Portland, Me.
Crandall Packing Co., Palmyra, N. Y.
*DE LA VERGNE MACHINE CO., 1123 E. 138th St., New York, N. Y...*p. 40*
*FRANCE PACKING CO., Tacony, Philadelphia, Pa...*p. 255*
GOODRICH, B. F. RUBBER CO., Akron, Ohio..*pp. 258, 259*
Goodsell Packing Co., Maywood, Ill.
Gould Packing Co., 88 Cambridge St., East Cambridge, Mass.
Harper Mfg. Co., Chester, Pa.
Hart Packing Co., 144 High St., Boston, Mass.
Ideal Metallic Packing Co., South Stillwater, Minn.
Imperial Packing Corp'n, 191 Greenwich St., New York, N. Y.
*JENKINS BROS., 80 White St., New York, N. Y...*pp. 180, 181*
*JOHNS-MANVILLE (Inc.), New York, N. Y...*p. 244*
Johnson, Henry Co., Gates Ave. & Blvd., Jersey City, N. J.
Pacific Coast Rubber & Supply Co., 316 Mission St., San Francisco, Cal.
SCHIEREN, CHAS. A. CO., 30-38 Ferry St., New York, N. Y...*pp. 362, 363*

—Asbestos

Advance Packing & Supply Co. (''Tenax''), 11 N. Franklin St., Chicago, Ill.
American Steam Packing Co., 165 High St., Boston, Mass.
Asbestos & Rubber Works of America (Inc.), 1821 Broadway, New York, N. Y.
Aycock, R. V. Co., 1702 Grand Ave., Kansas City, Mo.
*CRANE CO., 836 S. Michigan Ave., Chicago, Ill...*pp. 170, 171, 172, 173*
Danubil Co., 258 Broadway, New York, N. Y.
Dominion Asbestos & Rubber Corp'n, 154 Nassau St., New York, N. Y.
Eureka Packing Co., 78-80 Murray St., New York, N. Y.
Federal Asbestos Co., 149 Hamburgh Ave., Paterson, N. J.
FRANKLIN MFG. CO., Franklin, Pa...*p. 245*
General Asbestos & Rubber Co. (''Garco''), Charleston, S. C.
Gould Packing Co., 88 Cambridge St., East Cambridge, Mass.
*GREENE, TWEED & CO. (''Palmetto''), 109 Duane St., New York, N. Y...*p. 250*
Hollow Center Packing Co., 1276 W. 3rd St., Cleveland, Ohio
*JENKINS BROS., 80 White St., New York, N. Y...*pp. 180, 181*
*JOHNS-MANVILLE (Inc.), New York, N. Y...*p. 244*
Keasbey, Robert A. Co., 445 West St., New York, N. Y.
Knowlton, Geo. W. Rubber Co., 60 Pearl St., Boston, Mass.
Niagara Falls (Ont.) Gasket & Packing Co. (''Klingtite''), 50 Church St., New York, N. Y.
Plastic Metallic Packing Co. (''Holdfast''), 642 Engineers Bldg., Cleveland, Ohio
Steam Equipment Mfg. Co., 8077 Jenkins Arcade Bldg., Pittsburgh, Pa.
Strong Machinery & Supply Co., 21 Walker St., New York, N. Y.
U. S. Indestructible Gasket Co. (''Klingtite''), Hudson Terminal Bldg., New York, N. Y.

—Asbestos (Flat & Rod)

Johns-Pratt Co., (''Vulcabeston''), 155 Capitol Ave., Hartford, Conn.

—Asbestos & Rubber

Cincinnati Rubber Mfg. Co., Cincinnati, Ohio
*CRANE CO., 836 S. Michigan Ave., Chicago, Ill...*pp. 170, 171, 172, 173*
GOODRICH, B. F. RUBBER CO., Akron, Ohio..*pp. 258, 259*
*JOHNS-MANVILLE (Inc.), New York, N. Y...*p. 244*
Mikesell Brothers Co., 156 N. LaSalle St., Chicago, Ill.

—Benzol

Fibre Finishing Co. (''Vellumoid''), 78 Tremont St., Boston, Mass.

—Fibre

American Steam Packing Co., 165 High St., Boston, Mass.
AMERICAN VULCANIZING FIBRE CO., Wilmington, Del...*p. 417*
*CONTINENTAL FIBRE CO., Newark, Del. *p. 418*
Fibre Finishing Co. (''Vellumoid''), 78 Tremont St., Boston, Mass.
Goodsell Packing Co., Maywood, Ill.
*JOHNS-MANVILLE (Inc.), New York, N. Y...*p. 244*

—Gasoline

Fibre Finishing Co. (''Vellumoid''), 78 Tremont St., Boston, Mass.

—Hydraulic

Belmont Packing & Rubber Co. (''Belmont''), 133 N. 2nd St., Philadelphia, Pa.
Brandt, Randolph, 66 Cortlandt St., New York, N. Y.
BURROUGHS, CHARLES CO. (The), Newark, N. J...*p. 590*
Cancos Mfg. Co., Bridge & Garden Sts., Bridgesburg, Philadelphia, Pa.
Clark Flexible Metallic Packing Co., 59-67 Kennebec St., Portland, Me.
Crandall Packing Co., Palmyra, N. Y.
Crane Packing Co., 1800 Cuyler Ave., Chicago, Ill.
Dominion Asbestos & Rubber Corp'n, 154 Nassau St., New York, N. Y.
ELMES, CHAS. F. ENGINEERING WORKS. 215 N. Morgan St., Chicago, Ill...*p. 591*
Eureka Packing Co., 78-80 Murray St., New York, N. Y.
Excelsior Valve Co., 106-108 Fulton St., New York, N. Y.
*FRANCE PACKING CO., (''Tacony'') Philadelphia, Pa...*p. 255*
Garlock Packing Co., Palmyra, N. Y.
GOODRICH, B. F. RUBBER CO., Akron, Ohio..*pp. 258, 259*
*GREENE, TWEED & CO. (''Manhattan'') 109 Duane St., New York, N. Y...*p. 250*
Hollow Center Packing Co., 1276 W. 3rd St., Cleveland, Ohio
Imperial Packing Corp'n, 191 Greenwich St., New York, N. Y.
*JOHNS-MANVILLE (Inc.), New York, N. Y...*p. 244*
Mabbs Hydraulic Packing Co., 431 S. Dearborn St., Chicago, Ill.
Maguire Rubber Co., 200 Fifth Ave., New York, N. Y.
NEW YORK RUBBER CO., 34 Reade St., New York, N. Y...*pp. 260, 261*
Pacific Coast Rubber & Supply Co., 316 Mission St., San Francisco, Cal.
Preston Co., Horace G. (''Wear Well''), 90 Beecher Ave., Detroit, Mich.
SCHIEREN, CHAS. A. CO., 30-38 Ferry St., New York, N. Y...*pp. 362, 363*
Steel Mill Packing Co., 42 W. Larned St., Detroit, Mich.
Walker, James & Co., Ltd. (''Lion''), 46 West St., New York, N. Y.
Walsh Packing Co., 304 New St., Philadelphia, Pa.
WATSON-STILLMAN CO., 35 Church St., New York, N. Y...*p. 596*
Watt's, John M. Sons, 54 N. Second St., Philadelphia, Pa.

Pa

Digitized by Google

PACKING (Continued)

—Leather

Chicago Belting Co., 113 N. Green St., Chicago, Ill.
Coe & Brown Co., New Haven, Conn.
Graton & Knight Mfg. Co., Worcester, Mass.
Preston, Horace G. Co. (''Wear Well''), 90 Beecher Ave., Detroit, Mich.
SCHIEREN, CHAS. A. CO., 30-38 Ferry St., New York, N. Y...*pp. 362, 363*

—Metallic

ALLAN, A. & SON, Harrison, N. J...*p. 413*
American Huhn Metallic Packing Co., Woolworth Bldg., New York, N. Y.
AMERICAN METALLIC PACKING CO., N. S. Pittsburgh, Pa...*p. 254*
American Steam Packing Co., 165 High St., Boston, Mass.
Clark Flexible Metallic Packing Co., 59-67 Kennebec St., Portland, Me.
Collins Metallic Packing Co. (''Collins''), 56-58 N. Second St., Philadelphia, Pa.
Comee Metallic Packing Co., Stevens Point, Wis.
Crane Packing Co., 1800 Cuyler Ave., Chicago, Ill.
Cunningham Metallic Packing Co., Kingsbridge, New York, N. Y.
Endura Mfg. Co. (''Durametallic''), 63rd & Eastwick Ave., Philadelphia, Pa.
Eureka Packing Co., 78-80 Murray St., New York. N. Y.
Federal Metallic Packing Co. (''Federalite''), 48 Hanover St, Boston, Mass.
*FRANCE PACKING CO. (''Tacony'') Philadelphia, Pa...*p. 255*
*GOETZE GASKET & PACKING CO. (''Goetze''), 11 Allen Ave., New Brunswick, N. J...*p. 256*
Goodsell Packing Co., Maywood, Ill.
Harper Mfg. Co., Chester, Pa.
Holmes Metallic Packing Co., Wilkes-Barre, Pa.
Ideal Metallic Packing Co., South Stillwater, Minn.
Jerome-Edwards Metallic Packing Co., 3136-3138 W. Chicago Ave., Chicago, Ill.
*JOHNS-MANVILLE (Inc.), New York, N. Y...*p. 244*
Katzenstein, L. & Co., 358 West St., New York, N. Y.
Lubricating Metal Co. (''Noheet''), 2 Rector St., New York, N. Y.
Martell Packings Co., Elyria, Ohio
Merrill & Co., Wm. B. (''Tripp Packing''), 3368 Washington St., Boston 30, Mass.
Metallo Gasket Co., 16-20 Bethany St., New Brunswick, N. J.
National Metallic Packing Co., Oberlin, Ohio
Paine Metallic Packing Co., Shawanese, Pa.
Plastic Metallic Packing Co. (''Holdfast''), 642 Engrs. Bldg., Cleveland, Ohio
Steel Mill Packing Co., 43 W. Larned St., Detroit Mich.
Strong Machinery & Supply Co., 21 Walker St., New York, N. Y.
Swain Company, 443 W. 31st St., Chicago, Ill.
*UNITED STATES METALLIC PACKING CO., 429 N. 13th St., Philadelphia, Pa. *p. 257*
Walker Metallic Packing Co., 4617-21 Tacony St., Frankford, Philadelphia, Pa.

—Oil

Clark Flexible Metallic Packing Co., 59-67 Kennebec St., Portland, Me.
Fibre Finishing Co. (''Vellumoid''), 73 Tremont St., Boston, Mass.
GOODRICH, B. F. RUBBER CO., Akron, Ohio..*pp. 258, 259*

—Rawhide

Mabbs Hydraulic Packing Co, 431 S. Dearborn St.. Chicago, Ill.

—Rod (Piston and Valve)

American Huhn Metallic Packing Co., Woolworth Bldg., New York, N. Y.
AMERICAN METALLIC PACKING CO., N. S. Pittsburgh, Pa...*p. 254*
Belmont Packing & Rubber Co. (''Belmont''), 133 N. 2nd St., Philadelphia, Pa.
Brandt, Randolph, 66 Cortlandt St., New York, N. Y.
Cancos Mfg. Co., Bridge & Garden Sts., Bridesburg, Philadelphia, Pa.
Chesterton, A. W. Co., 64 India St., Boston, Mass.
Clark Flexible Metallic Packing Co., 59-67 Kennebec So., Portland, Me.
Comee Metallic Packing Co., Stevens Point, Wis.
Crandall Packing Co., Palmyra, N. Y.
Crane Packing Co., 1800 Cuyler Ave., Chicago, Ill.
Crown Mfg. Co., Cleveland, Ohio
Dominion Asbestos & Rubber Corp'n, 154 Nassau St., New York. N. Y.
''Double Service'' Packing Co., 246 Chestnut St., Philadelphia, Pa.
Durabla Mfg. Co., 114 Liberty St., New York, N. Y.
Eagle Oil & Supply Co. (''Eagleine''), 44-45-46 India St., Boston, Mass.
Endura Mfg. Co. (''Durametallic''), 63rd & Eastwick Ave., Philadelphia, Pa.
Eureka Packing Co., 78-80 Murray St., New York, N. Y.
Federal Metallic Packing Co., 48 Hanover St., Boston, Mass.
*FRANCE PACKING CO. (''Tacony'') Philadelphia, Pa...*p. 255*
Garlock Packing Co., Palmyra, N. Y.
*GOETZE GASKET & PACKING CO. (''Goetze''), 11 Allen Ave., New Brunswick, N. J...*p. 256*
GOODRICH, B. F. RUBBER CO., Akron, Ohio..*pp. 258, 259*
Gould Packing Co., 88 Cambridge St., East Cambridge, Mass.
Harper Mfg. Co., Chester, Pa.
Hart Packing Co., 144 High St., Boston, Mass.
Holmes Metallic Packing Co., Wilkes-Barre, Pa.
Ideal Metallic Packing Co., South Stillwater, Minn.
Imperial Packing Corp'n, 191 Greenwich St., New York, N. Y.
Jerome-Edwards Metallic Packing Co., 3136-3138 W. Chicago Ave., Chicago, Ill.
*JOHNS MANVILLE (Inc.), (''Sea-Rings''), New York, N. Y...*p. 244*
Johnson, Henry Co., Gates Ave. & Blvd., Jersey City, N. J.
Merrill, Wm. B. & Co. (''Tripp Packing''), 3368 Washington St., Boston 30, Mass.
NEW YORK RUBBER CO., 34 Reade St., New York, N. Y...*pp. 260, 261*
Pacific Coast Rubber & Supply Co., 316 Mission St., San Francisco, Cal.
Quaker City Rubber Co. (''P. P. P.''), 629 Market St., Philadelphia, Pa.
Sarkins Metallic Packing Co., Pittsburgh, Pa.
Steel Mill Packing Co., 42 W. Larned St., Detroit, Mich.
*UNITED STATES METALLIC PACKING CO., 429 N. 13th St., Philadelphia, Pa...*p. 257*
Walker, James & Co. (Ltd.) (''Lion''), 46 West St., New York, N. Y.
Walsh Packing Co., 304 New St., Philadelphia, Pa.

Digitized by Google

—Rubber
Anchor Packing Co., 7th & Filbert Sts., Philadelphia, Pa.
Belmont Packing & Rubber Co. (''Belmont''), 133 N. Second St., Philadelphia, Pa.
Cancos Mfg. Co., Bridge & Garden Sts., Bridesburg, Philadelphia, Pa.
Consolidated Rubber Co., P. O. Box 86, Trenton, N. J.
Empire Rubber & Tire Co., Trenton, N. J.
GOODRICH, B. F. RUBBER CO., Akron, Ohio...*pp. 258, 259*
Goodyear Tire & Rubber Co., Akron, Ohio
Gutta Percha & Rubber Mfg. Co., 126-128 Duane St.. New York, N. Y.
*JENKINS BROS, 80 White St., New York, N. Y...*pp. 180, 181*
*JOHNS-MANVILLE (Inc.), New York, N. Y...*p. 244*
Johnson, Henry Co., Gates Ave. & Blvd., Jersey City, N. J.
Knowlton, Geo. W. Rubber Co. (''Knowlton''), 60 Pearl St., Boston, Mass.
Mercer Rubber Co., Hamilton Square, N. J.
N. J. Car Spring & Rubber Co., Jersey City, N. J.
New York Belting & Packing Co., 91-93 Chambers St., New York, N. Y.
NEW YORK RUBBER CO., 34 Reade St., New York, N. Y...*pp. 260, 261*
Quaker City Rubber Co., 629 Market St., Philadelphia, Pa.
Strong Machinery & Supply Co., 21 Walker St., New York, N. Y.
United States Rubber Co., 1790 Broadway, New York, N. Y.
Walker, James & Co. (Ltd.), 46 West St., New York, N. Y.

—Sheet
AMERICAN VULCANIZED FIBRE CO.. Wilmington, Del...*p. 417*
Cancos Mfg. Co., Bridge & Garden Sts., Bridesburg, Philadelphia, Pa.
Dominion Asbestos & Rubber Corp'n, 154 Nassau St., New York, N. Y.
Durabla Mfg. Co., 114 Liberty St., New York, N. Y.
Edison Packing & Sales Co., 234 State St., Boston, Mass.
Eudura Mfg. Co. (''Endura''), 63rd & Eastwick Ave., Philadelphia, Pa.
Eureka Packing Co., 78-80 Murray St., New York, N. Y.
Federal Asbestos Co., 149 Hamburgh Ave., Paterson, N. J.
Garlock Packing Co., Palmyra, N. Y.
*GOETZE GASKET & PACKING CO. (''Goetzerit''), 11 Allen Ave., New Brunswick. N. J...*p. 256*
GOODRICH, B. F. RUBBER CO., Akron, Ohio..*pp. 258, 259*
Hamilton Rubber Mfg. Co., Trenton, N. J.
Hart Packing Co., 144 High St., Boston, Mass.
Hollow Center Packing Co., 1276 W. 3rd St., Cleveland, Ohio
Janos Asbestos Co., 26 Cortlandt St., New York, N. Y.
*JENKINS BROS., 80 White St., New York. N. Y...*pp. 180, 181*
*JOHNS-MANVILLE (Inc.), New York, N. Y...*p. 244*
La Favorite Rubber Mfg. Co., Paterson, N. J.
NEW YORK RUBBER CO.. 34 Reade St., New York, N. Y...*pp. 260, 261*
Niagara Falls (Ont.) Gasket & Packing Co. (''Klingtite''), 50 Church St., New York, N. Y.
Plastic Metallic Packing Co., 642 Engrs. Bldg., Cleveland, Ohio
Quaker City Rubber Co. (''Ebonite''), 629 Market St., Philadelphia, Pa.
Standard Mfg. & Supply Co. (''Stanbesto''), 30 N. 4th St., Philadelphia, Pa.
United States Asbestos Co., Fehl Bldg., Lancaster, Pa.
Voorhees Rubber Mfg. Co., 18-50 Bostwick Ave., Jersey City, N. J.

—Throttle (Locomotive)
Clark Flexible Metallic Packing Co., 59-67 Kennebec St., Portland, Me.
*JOHNS-MANVILLE (Inc.), New York, N. Y...*p. 244*
Union Machine Co., 183 University Ave., St. Paul, Minn.

PACKING MACHINES
Automatic Weighing Machine Co., 134-140 Commerce St., Newark, N. J.
FAIRBANKS, MORSE & CO., 900 S. Wabash Ave., Chicago, Ill...*p. 41*

PAILS
GEUDER, PAESCHKE & FREY CO. (''Cream City''), Western Valley, Milwaukee, Wis...*p. 434*

PAINT MAKING MACHINES
BARTLEET, C. O. & SNOW CO., Cleveland, Ohio...*p. 367*
Day, J. H. Co., 1144 Harrison Ave., Cincinnati, Ohio
KOVEN, L. O. & BRO., 154 Ogden Ave., Jersey City, N. J...*p. 605*
POOLE ENGRG & MACHINE CO., Woodberry, Baltimore, Md...*pp. 316, 317*
Ross, Chas. & Son Co., 148-156 Classon Ave., Brooklyn, N. Y

PAINT SPRAYING EQUIPMENT
DeVilbiss Mfg Co., 3754 Detroit Ave., Toledo, Ohio
*SPRAY ENGINEERING CO. (''Spraco''), 60 High St., Boston, Mass...*pp. 166, 167*

PAINTS (For Industrial Purposes)

—Acid Resistant
SILUMITE PRODUCTS CORPN., 1410 Morris Bldg., Philadelphia, Pa...*p. 663*

—Casehardening
Shore Instrument & Mfg. Co., (''Localcase''), 9025-9029 Van Wyck Ave., Jamaica, N. Y.

—Concrete
Smooth-On Mfg. Co., 570-574 Communipaw Ave., Jersey City, N. J.
Truscon Laboratories, Cor. Caniff & G. T. R. R., Detroit, Mich.

—Graphite
United States Graphite Co., Saginaw, Mich.

—Steel Preservative
Master Builders Co., 1836 Euclid Ave., Cleveland, Ohio
Toch Brothers, 320 Fifth Ave., New York, N. Y.
SILUMITE PRODUCTS CORPN., 1410 Morris Bldg., Philadelphia, Pa...*p. 663*

PANEL BOARDS
Allen-Bradley Co., 286 Greenfield Ave., Milwaukee, Wis.

PANS
Katzinger Co., Edward, 120 N. Peoria St., Chicago, Ill.

—Assembling Work
HONHORST, JOS. CO., 1016-20 W. 6th St., Cincinnati, Ohio...*p. 654*
Katzinger, Edward Co., 120 N. Peoria St., Chicago, Ill.
NEW BRITAIN MACHINE CO., New Britain, Conn...*p. 463*

—Drip
GEUDER, PAESCHKE & FREY CO. (''G. P. & F.''), Western Valley, Milwaukee, Wis...*p. 434*
HONHORST, JOS. CO., 1016-20 W. 6th St., Cincinnati, Ohio...*p. 654*

Pa

Digitized by Google

PANS (Continued)
Katzinger, Edward Co., 120 N. Peoria St., Chicago, Ill.
KOVEN, L. O. & BROTHER, 154 Ogden Ave., Jersey City, N. J...*p. 605*
SKINNER BROS. MFG. CO. (Inc.), 1400-1490 Vandevanter Ave., St. Louis, Mo...*p. 621*

—Foundry
Hadfield-Penfield Steel Co., Bucyrus, Ohio

—Grinding
BONNOT CO., Canton, Ohio...*p. 598*
CHAMBERS BROS. CO., Philadelphia, Pa...*p. 599*
Eagle Iron Works, Des Moines, Ia.
FROST MFG. CO., 112 W. Adams St., Chicago, Ill...*pp. 68, 634*
National Engineering Co., 549 W. Washington Blvd., Chicago, Ill.
Pennsylvania Crusher Co., 1324 Stephen Girard Building, Philadelphia, Pa.
Phillips & McLaren Co., 24th & Smallman Sts., Pittsburgh, Pa.
Stevenson Co., Wellsville, Ohio

—Lathe
GEUDER, PAESCHKE & FREY CO. ("G. P. & F."), Western Valley, Milwaukee, Wis...*p. 434*
HONHORST, JOS. CO., 1016-20 W. 6th St., Cincinnati, Ohio...*p. 654*

—Storage (For Machine Parts)
GEUDER, PAESCHKE & FREY CO. ("G. P. & F."), Western Valley, Milwaukee, Wis...*p. 434*
Katzinger, Edward Co., 120 Peoria St., Chicago, Ill.
NEW BRITAIN MACHINE CO., New Britain, Conn...*p. 463*

—Vacuum
*BADGER, E. B. & SONS CO., 75 Pitts St., Boston, Mass...*p. 164*
Bartlett Hayward Co., Baltimore, Md.
BIGGS BOILER WORKS CO., Case Ave. & Newton St., Akron, Ohio...*p. 650*
GEUDER, PAESCHKE & FREY CO., Western Valley, Milwaukee, Wis...*p. 434*
KOVEN, L. O. & BROTHER, 154 Ogden Ave., Jersey City, N. J...*p. 605*
LASKER IRON WORKS, 3201 So. Lincoln St., Chciago, Ill...*p. 655*
LOUISVILLE DRYING MACHINERY CO., Louisville, Ky...*p. 608*
MANISTEE IRON WORKS CO., Manistee, Mich...*pp. 158, 576*
Philadelphia Coppersmithing Co., 222-226 N. Front St., Philadelphia, Pa.
WILCOX ENGINEERING CO., Saginaw, Mich...*pp. 272, 613*
Zaremba Co., 506 Niagara Life Bldg., Buffalo, N. Y.

—Vacuum (Glass Lined)
Pfaudler Co., 217 Cutler Bldg., Rochester, N. Y.

—Vacuum (Steam Jacketed)
BIGGS BOILER WORKS CO., Case Ave. & Newton St., Akron, Ohio...*p. 650*
LASKER IRON WORKS, 3201 So. Lincoln St., Chicago, Ill...*p. 655*
MILWAUKEE RELIANCE BOILER WORKS, Milwaukee, Wis...*p. 148*
Sowers Mfg. Co., 1300 Niagara St., Buffalo, N. Y.

PAPER BAG MACHINERY
Jagenberg Machine Co. (Inc.), 131 W. 24th St., New York, N. Y.
Potdevin Machine Co., 1222 38th St., Brooklyn, N. Y.

PAPER COATING MACHINES
Potdevin Machine Co., 1222 38th St., Brooklyn, N. Y.

PAPER FEEDING MACHINES
Dexter Folder Co., 28 W. 23rd St., New York, N. Y.

PAPER FINISHING MACHINES
Revolute Machine Co., 417 E. 93rd St., New York, N. Y.

PAPER MILL MACHINERY
Bagley & Sewall Co., Watertown, N. Y.
BIGGS BOILER WORKS CO., Case Ave. & Newton St., Akron, Ohio...*pp. 650, 745*
Bird Machine Co., Neponsit St., South Walpole, Mass.
Black-Clawson Co., Hamilton, Ohio
Davis, Frank H., Richdale Ave., Cambridge, Mass.
Dilts Machine Works (Inc.), Fulton, N. Y.
Dominion Engrg. Works (Ltd.), P. O. Box 2799, Montreal, Quebec
Downington Mfg. Co., West Downington, Pa.
Emerson Mfg. Co., Lawrence, Mass.
Farnham Mfg. Co., 31-39 Indiana St., Buffalo, N. Y.
Holyoke Machine Co., Holyoke, Mass.
Jagenberg Machine Co. (Inc.), 131 W. 24th St., New York, N. Y.
*JOLLY, J. & W. (Inc.), Holyoke, Mass...*p. 32*
Jones, E. D. & Sons Co., P. O. Box 1632, Pittsfield, Mass.
LASKER IRON WORKS, 3201 So. Lincoln St., Chicago, Ill...*p. 655*
Moore & White Co., Philadelphia, Pa.
Norwood Engineering Co., Florence, Mass.
PERKINS, B. F. & SON (Inc.), Holyoke, Mass...*p. 558*
PUSEY & JONES CO., Wilmington, Del...*p. 269*
Rice, Barton & Fales Machine & Iron Co., Worcester, Mass.
Ryther & Pringle Co., Carthage, N. Y.
SANDUSKY FOUNDRY & MACHINE CO., Sandusky, Ohio...*p. 646*
Union Iron Works, Bangor, Maine
*U. S. CAST IRON PIPE & FOUNDRY CO., Burlington, N. J...*pp. 232, 233*
VALLEY IRON WORKS CO., Appleton, Wis...*p. 647*

PAPER PULP MACHINERY
Bagley & Sewall Co., Watertown, N. Y.
Carthage Machine Co., Carthage, N. Y.
Davis, Frank H., 175 Richdale Ave., Cambridge, Mass.
Dominion Engineering Works, Ltd., P. O. Box 2799, Montreal, Quebec, Canada
Downington Mfg. Co., West Downington, Pa.
Emerson Mfg. Co., Lawrence, Mass.
PUSEY & JONES CO., Wilmington, Del...*p. 269*
Rice, Barton & Fales Machine & Iron Co., Worcester, Mass.
Ryther & Pringle Co., Carthage, N. Y.
SWENSON EVAPORATOR CO., 945 Monadnock Bldg., Chicago, Ill...*p. 611*
Union Iron Works, Bangor, Me.
VALLEY IRON WORKS CO., Appleton, Wis...*p. 647*
Wallace-Bird Pine Products (Inc.), 5 Beekman St., New York, N. Y.

PAPER TESTING MACHINES
OLSEN, TINIUS TESTING MACHINE CO., 500 N. 12th St., Philadelphia, Pa...*pp. 265, 266, 267*
PERKINS, B. B. & SON (Inc.), ("Mullen," "Perkins"), Holyoke, Mass...*p. 558*
RIEHLE BROS. TESTING MACHINE CO., 1424 N. 9th St., Philadelphia, Pa...*p. 268*
*WESTINGHOUSE ELECTRIC & MFG. CO., East Pittsburgh, Pa...*pp. 160, 161*

PAPER WORKING MACHINERY
Knowlton, M. D. Co., 29 Elizabeth St., Rochester, N. Y.

Digitized by Google

PARAFFINE WAX PLANTS
CARBONDALE MACHINE CO., Carbondale, Pa...*p. 630*
*VOGT, HENRY MACHINE CO., Louisville, Ky...*pp. 632, 633*

PARTITIONS
—Rolling
Wilson, J. G. Corpn., 8 West 40th St., New York, N. Y.
—Steel
Lupton's, David Sons Co., Allegheny Ave. & Tulip St., Philadelphia, Pa.

PASTEURIZERS
KOVEN, L. O. & BROTHER, 154 Ogden Ave., Jersey City, N. J...*p. 605*
Loew Mfg. Co., 9100 Madison Ave., Cleveland, Ohio

PATTERN SHOP MACHINERY
Oliver Machinery Co., Grand Rapids, Mich.
Wallace, J. D. & Co., 1401 W. Jackson Blvd., Chicago, Ill.

PATTERNS (Metal and Wood)
Blair Tool and Machine Works (Inc.), 515-521 Greenwich St., New York, N. Y.
Bryan Pattern & Machine Co., Bryan, Ohio
BUDD GRATE CO., 2013 E. Letterly St., Philadelphia, Pa...*p. 128*
Buffalo Gear & Pattern Works, 18 Elk St., Buffalo, N. Y.
ELMES, CHAS. F. ENGINEERING WORKS, 215 N. Morgan St., Chicago, Ill...*p. 591*
*JONES, W. A. FOUNDRY & MACH. CO., 4415 W. Roosevelt Road, Chicago, Ill...*pp. 312, 313, 314, 315*
Modern Pattern & Machine Co., 451 Monroe Ave., Detroit, Mich.
Mummert, Dixon Co., Hanover, Pa.
Munson, E. G., Carton Ave., Utica, N. Y.
TORRINGTON MFG. CO., Torrington, Conn. *p. 641*
U. S. Molding Machine Co., 968 E. 69th Place, Cleveland, Ohio

PAVING BLOCKS
—Asphalt
HASTINGS PAVEMENT CO., 25 Broad St., New York, N. Y...*p. 661*
—Wood
Jennison-Wright Co., 2463 Broadway, Toledo, Ohio
Pittsburgh Wood Preserving Co., 1053 Century Bldg., Pittsburgh, Pa.
Wyckoff Pipe & Creasoting Co., 30 E. 42nd St., New York, N. Y.

PAVING PLANTS, ASPHALT
Warren Bros. Co., 9 Cambridge St., Boston, Mass.

PEBBLE MILLS
(See Mills, Pebble)

PENCILS (Drawing)
American Lead Pencil Co., 220 Fifth Ave., New York, N. Y.
Faber Eberhard, 37 Greenpoint Ave., Brooklyn, N. Y.
Koh-I-Noor Pencil Co., 34 E. 23rd St., New York, N. Y.

PENSTOCKS
Kellogg, M. W. Co., 90 West St., New York, N. Y.
NEW YORK CENTRAL IRON WORKS CO. (Inc.), North Middleburg Road, Hagerstown, Md...*p. 659*
Petroleum Iron Works Co., Sharon, Pa.
Smith, S. Morgan Co., York, Pa.

PERFORATED SHEET METALS
(See Metals, Perforated)

PETROLEUM PRODUCTS
Atlantic Refining Co., 3144 Passyunk Ave., Philadelphia, Pa.
Galena-Signal Oil Co. of Texas, 1311 Carter Bldg., Houston, Tex.
Penn Oil & Supply Co., Oil City, Pa.
TIDE WATER OIL CO., 11 Broadway, New York, N. Y...*pp. 252, 253*
Waverly Oil Works Co., 54th St., Pittsburgh, Pa.

PHARMACEUTICAL MACHINERY
Colton, Arthur Co., 2600 East Jefferson Ave., Detroit, Mich.
Hess & Barker, 212-22 So. Darien St., Philadelphia, Pa.

PHOSPHOR-TIN
Empire Metal Co., Syracuse, N. Y.

PHOTO-ENGRAVERS' MACHINERY
ROYLE, JOHN & SONS, Paterson, N. J... *p. 643*

PHOTOGRAPHIC COPYING MACHINES
Photostat Corporation, 299 State St., Rochester, N. Y.
—Photo Litho Copyer
Post, Frederick Co. ("Post"), 3635 N. Hamlin Ave., Chicago, Ill.

PHOTOMICROGRAPHIC APPARATUS
Holz & Co. (Inc.), 17 Madison Ave., New York, N. Y.

PHOTOSTATS
Photostat Corporation, 299 State St., Rochester, N. Y.

PIANO ACTION MACHINES
Nilson, A. H. Machine Co., 1525 Railroad Ave., Bridgeport, Conn.

PICKING TABLES
Fairmont Mining Machinery Co., Fairmont, W. Va.

PICKLING MACHINES
Howard Iron Works, 285 Chicago St., Buffalo, N. Y.

PILE DRIVERS
AMERICAN HOIST & DERRICK CO., St. Paul, Minn...*p. 388*
INDUSTRIAL WORKS, Bay City, Mich... *pp. 392, 393*
*LIDGERWOOD MFG. CO., 96 Liberty St., New York, N. Y...*p. 388*
OHIO LOCOMOTIVE CRANE CO., Grace St., Bucyrus, Ohio...*p. 391*
McKiernan-Terry Drill Co., 15 Park Row, New York, N. Y.
Horton, John T. Co., 242 Bradhurst Ave., New York, N. Y.
Union Iron Works, Newark Ave. & Monroe St., Hoboken, N. J.

PILING, SHEET (Steel)
Lackawanna Steel Co., Buffalo, N. Y.

PILLOW BLOCKS
AMERICAN TOOL & MACHINE CO., Boston 9, Mass...*p. 614*
BASS FOUNDRY & MACHINE CO., Fort Wayne, Ind...*p. 57*
*BROWN, A. & F. CO., 79 Barclay St., New York, N. Y...*p. 303*
*CALDWELL, H. W. & SON, 17th St. & Western Ave., Chicago, Ill...*p. 370*
CHICAGO PULLEY & SHAFTING CO., 30 So. Clinton St., Chicago, Ill...*pp. 324, 325*
DODGE SALES & ENGINEERING CO., Mishawaka, Ind...*pp. 42, 43, 326, 327, 328, 329*
*FALLS CLUTCH & MACHINERY CO., Cuyahoga Flats, Ohio...*p. 330*
JEFFREY MFG. CO., 904 N. 4th St., Columbus, Ohio...*pp. 376, 377*
*JONES, W. A. FOUNDRY & MACHINE CO., 4415 West Roosevelt Road, Chicago, Ill...*pp. 312, 313, 314, 315*

Pi

Digitized by Google

PILLOW BLOCKS (Continued)
*MEDART PATENT PULLEY CO., St. Louis, Mo...*p. 333*
*WOOD'S, T. B. SONS CO., Chambersburg, Pa...*pp. 334, 335*

PIN MAKING MACHINES
Baird Machine Co., Bridgeport, Conn.

PINION CUTTING MACHINES (Clock and Watch)
Sloan & Chace Mfg. Co. (Ltd.), 6th Ave., N. 13th St., Newark, N. J.
Waltham Machine Works, Waltham, Mass.

PINIONS

—Bakelite
*BROWN, A. & F. CO., 79 Barclay St., New York, N. Y...*p. 303*
*FOOTE BROS. GEAR & MACHINE CO., 213-21 N. Curtis St., Chicago, Ill...*pp. 308, 309*
Ganschow, Wm. Co., Washington-Morgan St., Chicago, Ill.
*JAMES, D. O. MFG. CO., 1114-24 W. Monroe St., Chicago, Ill...*pp. 310, 311*
*JONES, W. A. FOUNDRY & MACHINE CO., 4415 West Roosevelt Road, Chicago, Ill...*pp. 312, 313, 314 315*
WESTINGHOUSE ELECTRIC & MFG. CO., E. Pittsburgh, Pa...*pp. 160, 161*

—Bronze
*JAMES, D. O. MFG. CO., 1114-24 W. Monroe St., Chicago, Ill...*pp. 310, 311*

—Cast Iron
*JAMES, D. O. MFG. CO., 1114-24 W. Monroe St., Chicago, Ill...*pp. 310, 311*

—Fibre
DIAMOND STATE FIBRE CO. ("Condensite Celoron"), Bridgeport Pa...*p. 420*

—Rawhide
*BROWN, A. & F. CO., 79 Barclay St., New York, N. Y...*p. 303*
*CALDWELL, W. E. CO., 340 E. Brandeis St., Louisville, Ky...*p. 323*
Ganschow, Wm. Co., Washington-Morgan St., Chicago, Ill.
*FOOTE BROS. GEAR & MACHINE CO., 213½ N. Curtis St., Chicago, Ill...*pp. 308, 309*
Hamilton Gear Co., Ltd., 76 Van Horne St., Toronto, Can.
Horsburgh & Scott Co., Cleveland, Ohio
*JAMES, D. O. MFG. CO., 1114-24 W. Monroe St., Chicago, Ill...*pp. 310, 311*
*JONES, W. A. FOUNDRY & MACHINE CO., 4415 W. Roosevelt Rd., Chicago, Ill...*pp. 312, 313, 314, 315*
MEACHEM GEAR CORPN., Canal St. and West Shore Railroad, Syracuse, N. Y...*p. 318*
Philadelphia Gear Works, 1120-24 Vine St., Philadelphia, Pa.
Stahl Gear & Machine Co., 1390 E. 40th St., Cleveland, Ohio

—Steel
*BROWN, A. & F. CO., 79 Barclay St., New York, N. Y...*p. 303*
*CALDWELL, H. W. & SON CO., 17th St. & Western Ave., Chicago, Ill...*p. 370*
*CALDWELL, W. E. CO., 340 E. Brandeis St., Louisville, Ky...*p. 323*
*DE LAVAL STEAM TURBINE CO., Trenton, N. J...*p. 22*
*JAMES, D. O. MFG. CO., 1114-24 Monroe St., Chicago, Ill...*pp. 310, 311*
*JONES, W. A. FOUNDRY & MACHINE CO., 4415 W. Roosevelt Rd., Chicago, Ill...*pp. 312, 313, 314, 315*
New Process Gear Corpn., Syracuse, N. Y.
POOLE ENGINEERING & MACHINE CO., Woodberry, Baltimore Md...*pp. 316, 317*
Van Dorn & Dutton Co. ("Van Dorn"), Cleveland, Ohio
Wade-American Tool Co., 311 Atlantic Ave., Boston, Mass.

PINKING MACHINES
Durbrow & Hearne, 12 Wooster St., New York, N. Y.

PINS

—Air Brake
CHAMPION RIVET CO., Cleveland, Ohio...*p. 521*

—Cotter
Gem Stopper Co., 2120 Nicholas St., Philadelphia, Pa.
WILLIAMS, J. H. & CO., 70 Richards St., Brooklyn, N. Y...*p. 517*

—Drift
VULCAN STEAM FORGING CO., 247 Rano St., Buffalo, N. Y...*p. 433*

—Knuckle
CHAMPION RIVET CO., Cleveland, Ohio...*p. 521*

—Piston
E. C. Mfg. Co., 546-548 W. Harrison St., Chicago, Ill.

—Taper
Belvidere Screw & Machine Co., Belvidere, Ill.

—Wrist
Wadell Motor Corpn., 661-667 Frelinghuysen Ave., Newark, N. J.

PIPE

—Acid Resistant
Duriron Co. Inc.), Dayton, Ohio

—Brass and Copper
AMERICAN BRASS CO., Waterbury, Conn...*p. 414*
Harris, Arthur & Co., 212 Curtis St., Chicago, Ill.
*WHEELER CONDENSER & ENGINEERING CO. ("Crescent Brand"), Carteret, N. J...*p. 162*

—Cast Iron (Bell & Spigot)
CLOW, JAMES B. & SONS, 534 So. Franklin St., Chicago, Ill...*pp. 230, 231*
*CRANE CO., 836 S. Michigan Ave., Chicago, Ill...*pp. 170, 171, 172, 173*
Davis & Farnum Mfg. Co., Foundry Ave., Waltham, Mass.
Donaldson Iron Co., Emaus, Lehigh Ave., Pa.
LYNCHBURG FOUNDRY CO., Lynchburg, Va...*p. 229*
Massillon Iron & Steel Co., Massillon, Ohio
National Cast Iron Pipe Co., Birmingham, Ala.
*PITTSBURGH VALVE FOUNDRY & CONSTRUCTION CO., P. O. Box 1016, Pittsburgh Pa...*p. 192, 193*
Standard Cast Iron Pipe & Foundry Co., Bristol, Pa.
*U. S. CAST IRON PIPE & FOUNDRY CO., Burlington, N. J...*pp. 232, 233*
Warren Foundry & Machine Co., 11 Broadway, New York, N. Y.
WOOD, R. D. & CO., Philadelphia, Pa...*p. 597*

—Cast Iron (Flanged)
American Cast Iron Pipe Co., Birmingham, Ala.
*CENTRAL FOUNDRY CO., 90 West St., New York, N. Y...*p. 228*
CLOW, JAMES B. & SONS, 534 So. Franklin St., Chicago, Ill...*pp. 230, 231*
*CRANE CO., 836 S. Michigan Ave., Chicago, Ill...*pp. 170, 171, 172, 173*
Donaldson Iron Co., Emaus, Lehigh Co., Pa.
*DOUGHERTY, M. J. CO., 25th & Washington, Philadelphia, Pa...*p. 234*

Digitized by Google

LYNCHBURG FOUNDRY CO., Lynchburg, Va...*p. 229*
Massillon Iron & Steel Co., Massillon, Ohio
National Cast Iron Pipe Co., Birmingham, Ala.
*PITTSBURGH VALVE, FOUNDRY & CONSTRUCTION CO., P. O. Box 1016, Pittsburgh, Pa...*pp. 192, 193*
Sacramento Pipe Works, 716 R. St., Sacramento, Cal.
Standard Cast Iron Pipe & Foundry Co., Bristol, Pa.
*U. S. CAST IRON PIPE & FOUNDRY CO., Burlington, N. J...*pp. 232, 233*
Warren Foundry & Machine Co., 11 Broadway, New York, N. Y.
WOOD, R. D. & CO., Philadelphia, Pa...*p. 597*

—Cast Iron (Flexible Joint)
*CENTRAL FOUNDRY CO., ("Universal Pipe"), 90 West St., New York, N. Y...*p. 228*
*U. S. CAST IRON PIPE & FOUNDRY CO., Burlington, N. J...*pp. 232, 233*

—Cast Iron (Plain End)
*U. S. CAST IRON PIPE & FOUNDRY CO., Burlington, N. J...*pp. 232, 233*

—Cast Iron (Prepared Joint)
American Cast Iron Pipe Co. ("Simplex"), Birmingham, Ala.
*CENTRAL FOUNDRY CO., 90 West St New York, N. Y...*p. 228*

—Cast Iron (Threaded)
CLOW, JAMES B. & SONS, 435 So. Franklin St., Chicago, Ill...*pp. 230, 231*
*U. S. CAST IRON PIPE & FOUNDRY CO. Burlington, N. J...*pp. 232, 233*

—Galvanized
Central Tube Co., First Nat'l Bank Bldg. Pittsburgh, Pa.

—Hard Rubber
American Hard Rubber Co., 11 Mercer St New York, N. Y.

—Lap Weld
Monongahela Tube Co., Pittsburgh, Pa.

—Riveted
Abendroth, G. Irving Co., 10 E. 43rd St., New York, N. Y.
Abendroth & Root Mfg. Co., 45 Broadway, New York, N. Y.
American Spiral Pipe Works, Box 485, Chicago, Ill.
Baker Iron Works, 950 N. Broadway, Los Angeles, Cal.
BIGGS BOILER WORKS CO., Case Ave. & Newton St., Akron, Ohio...*p. 650*
Carroll-Porter Boiler & Tank Co., Pittsburgh, Pa.
*CASEY-HEDGES CO., Chattanooga, Tenn...*pp. 60 61*
CONNERY & CO. (Inc.), 2nd and Luzerne Sts., Philadelphia, Pa...*p. 651*
East Jersey Pipe Corpn., 50 Church St., New York, N. Y.
KOVEN, L. O. & BRO., 154 Ogden Ave., Jersey City, N. J...*p. 605*
LANCASTER IRON WORKS (Inc.), Lancaster, Pa. *p. 656, 657*
LASKER IRON WORKS, 3201 So. Lincoln St., Chicago, Ill...*p. 655*
LEBANON BOILER WORKS (J. K. Petty & Co., Inc.), 6 So. 15th St., Philadelphia, Pa...*pp. 78, 79*
*LEFFEL, JAMES & CO., Springfield, Ohio. ...*p. 33*
McAleenan Bros. Co., 25th & R.R. Sts., Pittsburgh, Pa.
Machold & Riddell, 1020 Stephen Girard Bldg., Philadelphia, Pa.
NEW YORK CENTRAL IRON WORKS CO. (Inc.), North Middleburg Road, Hagerstown Md...*p. 659*
Sacramento Pipe Works, 716 R. St., Sacramento, Cal.
Standard Spiral Pipe Works, 4801 S. Rockwell St., Chicago, Ill.
*TITUSVILLE IRON WORKS CO., Titusville, Pa...*p. 89*
*WALSH & WEIDNER BOILER CO., Chattanooga, Tenn...*p. 91*
Western Gas Construction Co., Fort Wayne, Ind.

—Soil
*CENTRAL FOUNDRY CO., 90 West St., New York, N. Y...*p. 228*

—Steel
Bay City Iron Works, 1215-45 Harrison St., San Francisco, Cal.
Central Tube Co., 1st Natl. Bank Bldg., Pittsburgh, Pa.
Cincinnati Iron & Steel Co., Cincinnati, Ohio
CLOW, JAMES B. & SONS, 534 So. Franklin St., Chicago, Ill...*pp. 230, 231*
*CRANE CO., 836 S. Michigan Ave., Chicago, Ill...*pp. 170, 171, 172, 173*
*DOUGHERTY, M. J. CO., 25th & Washington Ave., Philadelphia, Pa...*p. 234*
East Jersey Pipe Corpn., 50 Church St., New York, N. Y.
Jones & Laughlin Steel Co., 3rd & Ross St., Pittsburgh, Pa.
La Belle Iron Works, Steubenville, Ohio
Mark Manufacturing Co., 2111 Conway Bldg., Chicago, Ill.
National Tube Co. ("National"), Frick Bldg., Pittsburgh, Pa.
NEWBURGH STEAM BOILER WORKS, (P. Delany & Co.), Newburgh, N. Y...*p. 64*
NEW YORK ENGINEERING CO., 2 Rector St., New York, N. Y...*p. 82*
Pancoast, Henry B. & Co., 940-962 N. Front St., Philadelphia, Pa.
*PITTSBURGH VALVE, FOUNDRY & CONSTRUCTION CO., P. O. Box 1016 Pittsburgh, Pa...*pp. 192, 193*
Youngstown Sheet & Tube Co., Youngstown, Ohio

—Welded
American Spiral Pipe Works, Box 485, Chicago, Ill.
Ballwood Co., 30 Church St., New York, N. Y.
*CRANE CO., 836 S. Michigan Ave., Chicago, Ill...*pp. 170, 171, 172, 173*
*DOUGHERTY, M. J. CO., 25th & Washington Ave., Philadelphia, Pa...*p. 234*
NEW YORK CENTRAL IRON WORKS CO (Inc.), North Middlesburg Road, Hagerstown, Md...*p. 659*
*PITTSBURGH VALVE, FOUNDRY & CONSTRUCTION CO., P. O. Box 1016, Pittsburgh, Pa...*pp. 192, 193*

—Wood
Michigan Pipe Co. ("Michigan"), Crotty and N. Madison Bay City, Mich.
Wyckoff, A. & Son Co., 100 Home St., Elmira, N. Y.

—Wood Lined
Boyts, Porter & Co., Cornellsville, Pa.

—Wood Stave
Michigan Pipe Co. ("Michigan"), Crotty and N. Madison, Bay City, Mich.

—Wrought Iron
Byers, A. M. Co., Pittsburgh, Pa.
CLOW, JAMES B. & SONS, 534 So. Franklin St., Chicago, Ill...*pp. 230, 231*
*CRANE CO., 836 S. Michigan Ave., Chicago, Ill...*pp. 170, 171, 172, 173*
McMann & Taylor Co., 104-106 John St., New York, N. Y.
Monongahela Tube Co., Pittsburgh, Pa.

Pi

Digitized by Google

PIPE (Continued)
NEWBURGH STEAM BOILER WORKS, (P. Delany & Co.), Newburgh, N. Y...*p. 64*
*PITTSBURGH VALVE, FOUNDRY & CONSTRUCTION CO., P. O. Box 1016, Pittsburgh, Pa...*pp. 192, 193*
Reading Iron Co., Reading, Pa.
Republic Iron & Steel Co., Youngstown, O.
Sacramento Pipe Works, 716 R St., Sacramento, Cal.

PIPE, BENDS, CLAMPS, COILS, COVERINGS, CUTTERS, FITTINGS, JOINTS, ETC.
(See Bends, Clamps, Coils, Coverings, Cutters, Fittings, Joints, Etc. Pipe.)

PIPE BENDING MACHINES
American Pipe Bending Machine Co., 46 Pearl St., Boston, Mass.
Cox Automatic Pipe Bending Co., 681-697 Boulevard, Bayonne, N. J.
Federal Bending Machine Co., Opera House Bldg., Bayonne, N. J.
HYDRAULIC PRESS MFG. CO. (The), Mount Gilead, Ohio...*p. 593*
Lewis, Joseph E., 1218 Warner St., Baltimore, Md.
Riverside Machine Co., Front & Penn Sts., Chester, Pa.
Underwood, H. B. Corpn., 1025 Hamilton St., Philadelphia, Pa.
WATSON-STILLMAN CO., 35 Church St., New York, N. Y...*p. 596*
WOOD, R. D. & CO., Philadelphia, Pa...*p. 597*

PIPE CUTTING AND THREADING MACHINES
Bignall & Keeler Machine Works, Edwardsville, Ill.
Borden Co. ("Beaver"), Warren, Ohio
Cox & Sons Co., 519 Lafayette Place, Philadelphia, Pa.
Curtis & Curtis Co., 189 Garden St., Bridgeport, Conn.
JARECKI MFG. CO., Erie, Pa...*pp. 178, 179*
Johnston, Wm. T. Co., Cincinnati, Ohio
*LANDIS MACHINE CO. (Inc.), Waynesboro, Pa...*pp. 496, 497*
Merrell Mfg. Co., 845 Curtis St., Toledo, O.
NILES-BEMENT-POND CO., 111 Broadway, New York, N. Y...*p. 470*
Oster Mfg. Co., 2057 E. 61st Place, Cleveland, Ohio
Pipe Machinery Co., 930 E. 70th St., Cleveland, Ohio
Saunders', D. Sons (Inc.), 21 Atherton St., Yonkers, N. Y.
Standard Engineering Co., Ellwood City, Pa.

PIPE CUTTING-OFF MACHINES
Bignall & Keeler Machine Works, Edwardsville, Ill.
*LANDIS MACHINE CO. (Inc.), Waynesboro, Pa...*pp. 496, 497*
Modern Machine Tool Co., 401 Water St., Jackson, Mich.
NILES-BEMENT-POND CO., 111 Broadway, New York, N. Y...*p. 470*
Roessing Mfg. Co., Sharpsburg St., Pittsburg, Pa.
San Francisco Engineering Co., 322-324 6th St., San Francisco, Cal.
Smith, A. P. Mfg. Co., East Orange, N. J.

PIPE EXPANDING AND FLANGING MACHINES
Lovekin Pipe Expanding & Flanging Machine Co. ("Lovekin"), 421 Chestnut St., Philadelphia, Pa.

PIPE LINE SUPPLIES
NATIONAL SUPPLY CO., Toledo, Ohio..*pp. 648, 649*

PIPE MILL MACHINERY
*LANDIS MACHINE CO. (Inc.), Waynesboro, Pa...*pp. 496, 497,*
Standard Engineering Co., Ellwood City, Pa.

PIPE PROTECTORS (Blow-Off)
Woolson's, O. C. Son, 39 Cortlandt St., New York, N. Y.

PIPE THAWERS
*GENERAL ELECTRIC CO. ("Wayne"), Schenectady, N. Y...*pp. 18, 19, 20, 21*

PIPE THREADING DEVICES
(See Tools, Thread Cutting)

PIPING
—Ammonia
*VILTER MFG CO., 1194-1196 Clinton St., Milwaukee, Wis...*pp. 16, 17*
YORK MANUFACTURING CO., York, Pa...*p. 631*

—Gas Producer
Borger Bros. Boiler Works, 257 W. Spring St., Columbus, Ohio

—Heating
*DOUGHERTY, M. J. CO., 25th & Washington Ave., Philadelphia, Pa...*p. 234*
KROESCHELL BROS. CO., 460 West Erie St., Chicago, Ill...*p. 75*
NATIONAL BOILER WASHING CO., Railway Exchange, Chicago, Ill...*p. 145*

—Power
Ballwood Co., 30 Church St., New York, N. Y.
Best Co., 1409 Arvott Bldg., Pittsburgh, Pa.
*CRANE CO., 836 S. MICHIGAN AVE., Chicago, Ill...*pp. 170, 171, 172, 173*
*DOUGHERTY, M. J. CO., 25th & Washington Ave., Philadelphia, Pa...*p. 234*
Grinnell Co., Providence, R. I.
Kellogg, M. W. Co., 90 West St., New York, N. Y.
KROESCHELL BROS. CO., 460 West Erie St., Chicago, Ill...*p. 75*
Limbert, Geo. B. & Co., 570 Fulton St., Chicago, Ill.
Lumaden & Van Stone Co., 426 First St., South Boston, Mass.
Mitchell, W. K. & Co. (Inc.), 2940 Ellsworth St., Philadelphia, Pa.
NATIONAL BOILER WASHING CO., Railway Exchange, Chicago, Ill...*p. 145*
National Valve & Mfg. Co., Pittsburgh, Pa.
Pittsburgh Piping & Equipment Co., 35th & Charlotte Sts., Pittsburgh, Pa.
*PITTSBURGH VALVE, FOUNDRY & CONSTRUCTION CO., P. O. Box 1016, Pittsburgh, Pa...*pp. 192, 193*
Power Piping Co., Beaver and Western Ave., Pittsburgh, Pa.
Simmons, John Co., 104-110 Center St., New York, N. Y.
Simmons Pipe Bending Works, 40 Mechanic St., Newark, N. J...*p. 235*
*U. S. CAST IRON PIPE & FOUNDRY CO., Burlington, N. J...*pp. 232, 233*
Whitney-McDonald Co., 2320 E. Tioga St., Philadelphia, Pa.

—Welded
Electric Welding Co. of America, 764 Court St., Brooklyn, N. Y.

PIPING INSTALLATIONS (Power)
*DOUGHERTY, M. J. CO., 25th & Washington Ave., Philadelphia, Pa...*p. 234*
National Valve & Mfg. Co., 3101 Liberty Ave., Pittsburgh, Pa.

PISTON RINGS
AMERICAN METALLIC PACKING CO., N. S. Pitsburgh, Pa...*p. 254*
Baker Valve Co., Box 1772, Minneapolis, Minn.
Dyer, G. H. Co., 155 Brookline St., Cambridge, Mass.
*EVER-TYTE PISTON RING DIVISION, Walter A. Zelnicker Supply Co., 1600 Kingsland Ave., St. Louis, Mo...*p. 246*
Foster, Merriam & Co., Meriden, Conn.

Digitized by Google

Keys Piston Ring Co., 3047-49-51 Olive St., St. Louis, Mo.
Micro Piston Ring Co. (''Micro''), 110-116 Nassau St., New York, N. Y.

PISTON TURNING MACHINES
INTERNATIONAL MACHINE TOOL CO. (''Libby''), 1124 W. 21st St. and Belt Railway, Indianapolis, Ind...*pp. 448, 449*
NATIONAL ACME CO., Cleveland, Ohio..*pp. 464, 465*

PISTONS
—Aluminum
Aluminum Manufacturers (Inc.), 6502 Carnegie St., Cleveland Ohio.

—Cast Iron
Bryan Pattern & Machine Co. (''Soulis''), Bryan, Ohio

—Gasoline Engine
Defiance Screw Machine Products Co., 731 Perry St., Defiance, Ohio
Dyer, G. H. Co., 155 Brookline St., Cambridge, Mass.
Wadell Motor Corpn., 661 Frelinghuysen Ave., Newark, N. J.

PITOT TUBES
(See Meters, Pitot Tube)

PLANERS
American Tool Works Co., Pearl & Eggleston Ave., Cincinnati, Ohio
Betts Machine Co., Rochester, N. Y.
Bickett Machine & Mfg. Co., Cincinnati, Ohio
Cincinnati Planer Co., Oakley, Cincinnati, Ohio
Cleveland Planer Co., 148 Superior Ave., Cleveland, Ohio
Gorton, George Machine Works, Racine, Wis.
Gray, C. A. Co., Gest & Depot Sts., Cincinnati, Ohio
LIBERTY MACHINE TOOL CO., Hamilton, Ohio...*p. 469*
Multiplex Tool Co. (Inc.), 76 S. 8th St., Brooklyn, N. Y.
Ohio Machine Tool Co., Kenton, Ohio
Rockford Machine Tool Company, Rockford, Ill.
Simmons Machine Co. (Inc.), 985 Broadway, Albany, N. Y.
Whitcomb-Blaisdell Machine Tool Co., Worcester, Mass.
Wilson, W. A. Machine Co., 217 N. Water St., Rochester, N. Y.
Woodward & Powell Planer Co., 97 Webster St., Worcester, Mass.

—Crank
Cincinnati Shaper Co., Cincinnati, Ohio

—Locomotive Cylinder
Morton Mfg. Co., Muskegon Heights, Mich.
Underwood, H. B. Corp'n, 1025 Hamilton St., Philadelphia, Pa.

—Open Side
Cincinnati Planer Co., Oakley, Cincinnati, Ohio
LIBERTY MACHINE TOOL CO., Hamilton Ohio..*p. 469*

—Plate
Covington Machine Co., Covington, Va.
NILES-BEMENT-POND CO., 111 Broadway, New York, N. Y...*p. 470*

—Traveling Head
Morton Mfg. Co., Muskegon Heights, Mich.

—Valve Seat (Portable)
Underwood, H. B. Corp'n, 1025 Hamilton St., Philadelphia, Pa.

—Variable Speed
NILES-BEMENT-POND CO., 111 Broadway, New York, N. Y...*p. 470*
Ohio Machine Tool Co., Kenton, Ohio
Woodward & Powell Planer Co., 97 Webster St., Worcester, Mass.

PLANIMETERS
AMERICAN STEAM GAUGE & VALVE MFG. CO. (''Amsler & Bushnell-Coffin''), Boston, Mass...*pp. 200, 201*
*BRISTOL CO., Waterbury, Conn...*p. 291*
*CROSBY STEAM GAUGE & VALVE CO., 40 Central St., Boston, Mass...*pp. 202, 208*
*FOXBORO CO. (Inc.), Foxboro, Mass...*p. ..293*
Robertson, Jas. L. & Sons (''Improved Willis''), 78-80 Murray St., New York, N. Y.
Trill Indicator Co., Center St., Corry, Pa.

PLANING MACHINES (Wood)
Newman Machine Co., Jackson St. & Southern Railway, Greensboro, N. Car.
Whitney, Baxter D. & Son (Inc.), Wichendon, Mass.

PLANTS: See
Benzol Recovery
By-product Coke Oven
By-product Recovery
Carbon
Cold Storage
Concrete Gravity
Dry Blast
Filtration
Gas
Gas Cleaning
Gravel Screening
Hydrating
Lighting
Paraffine Wax
Tar Distilling
Water Purifying

PLASTER MILL MACHINERY
UNION ENGINEERING CO., Cleveland, Ohio ..*p. 645*

PLATE METAL WORK
(See Steel Plate Construction)

PLATERS' SUPPLIES AND EQUIPMENT
Woodison, E. J. Co., Detroit, Mich.

PLATES
—Filter Press
*HENDRICK MFG. CO., Carbondale, Pa... *p. 653*

—Flattened, Ground and Polished
Moltrup Steel Products Co., Beaver Falls, Pa.

—Foundry Pattern
Moltrup Steel Products Co., Beaver Falls, Pa.

—Iron
Allegheny Steel Co., Pittsburgh, Pa.
GLASGOW IRON CO., Pottstown, Pa...*p. 99*
Illinois Steel Co., 208 S. La Salle Street, Chicago, Ill.

—Screw
(See Screw Plates)

—Steel
Carbon Steel Co., foot of 32nd St., Pittsburgh, Pa.
Central Iron & Steel Co., Front & Dock Sts., Harrisburg, Pa.
Inland Steel Co., 1105 First National Bank Bldg., Chicago, Ill.
Lukens Steel Co., Coatesville, Pa.
Otis Steel Co., 1140 Leaders News Bldg., Cleveland, Ohio
Rownson Drew & Clydesdale (Inc.), 68 William St., New York, N. Y.
Sligo Iron & Steel Co., Connellsville, Pa.
Wood, Allen Iron & Steel Co., Widener Bldg., Philadelphia, Pa.

—Universal
GLASGOW IRON CO., Pottstown, Pa...*p. 99*
La Belle Iron Works, Steubenville, Ohio

—Zinc
Illinois Zinc Co., Peru, Ill.

PLATING DYNAMOS
(See Generators, Low Voltage)

Pl

Digitized by Google

PLATINUM
Wilson, H. A. Co., 97 Chestnut St., Newark, N. J.

PLUGS
—Fusible
AMERICAN INJECTOR CO., Detroit, Mich. ..*p. 217*
*CRANE CO., 836 S. Michigan Ave., Chicago, Ill...*pp. 170, 171, 172, 173*
*JOHNS-MANVILLE (Inc.), New York, N. Y...*p. 244*
KELLY & JONES CO., Greensburg, Pa...*pp. 182, 183*
—Spark
Belvidere Screw & Machine Co., Belvidere, Ill.
Champion Ignition Co., Industrial Ave. & Harriet St., Flint, Mich.
Craig Mfg. Co., Cedar Rapids, Iowa
New Haven Screw Co., 191-193 Foster St., New Haven, Conn.

PLUMBING SUPPLIES
Bridgman Bros. Co., 120 South 30th St., Philadelphia, Pa.
CLOW, JAMES B. SONS, 534 So. Franklin St., Chicago, Ill...*pp. 230, 231*
PIERCE, BUTLER & PIERCE MFG. CORPN., 437 East 162nd St., New York, N. Y... *p. 204*

PLYWOOD MACHINERY
Merritt Engineering & Sales Co., Lockport, N. Y.

PNEUMATIC DESPATCH TUBES
(See Tubes, Pneumatic Despatch)

POLISHERS' SUPPLIES
Woodison, E. J. Co., Detroit, Mich.

POLISHING GRAIN
NORTON CO. (''Alundum'', ''Crystolon''), Worcester, Mass...*pp. 489, 510*

POLISHING MACHINERY
*BUILDERS IRON FOUNDRY (''Builders''), Providence, R. I...*p. 277*
Chase Turbine Mfg. Co., Orange, Mass.
Chicago Wheel & Mfg. Co., 1101-1108 W. Monroe St., Chicago, Ill.
Diamond Machine Co., 9 Codding St., Providence, R. I.
Divine Bros. Co., Utica, N. Y.
Excelsior Tool & Machine Co., East St. Louis, Ill.
Gardner Machine Co., Beloit, Wis.
Hammond Mfg. Co., 336 Frankfort Ave., Cleveland, Ohio
Hawes, C. L. 12 Adams St., Ashtabula, Ohio
NEW BRITAIN MACHINE CO., New Britain, Conn...*p. 463*
NOBLE & WESTBROOK MFG. CO., Hartford, Conn...*p. 494*
Partridge, E. O., 2047-2049 W. Lake St. Chicago, Ill.
Production Machine Co., Greenfield, Mass.
Robinson Automatic Machine Co., 6500 Russell St., Detroit, Mich.
Robinson, Wm. V. Co., Owosso, Mich.
St. Louis Machine Tool Co., 932 Loughborough Ave., St. Louis, Mo.
Webster & Perks Tool Co., 300 Center St., Springfield, Ohio
—Cutlery
Hemming Bros. Co. (Inc.), New Haven, Conn.

POLISHING WHEELS
Buffalo Pulley & Caster Co. (''Pull-Neck Leather''), 182 Breckenridge St., Buffalo, N. Y.

POTS
—Acid
FARRAR & TREFTS, Buffalo, N. Y...*p. 652*
*FULLER-LEHIGH CO., Fullerton, Pa...*p. ..128*
LYNCHBURG FOUNDRY CO., Lynchburg, Va...*p. 229*
*U. S. CAST IRON PIPE & FOUNDRY CO., Burlington, N. J...*pp. 232, 233*
—Annealing
Welded Steel Barrel Corp'n, Leib & Wright St., Detroit, Mich.
—Caustic
FARRAR & TREFTS, Buffalo, N. Y...*p. 652*
*FULLER-LEHIGH CO., Fullerton, Pa...*p. 128*
—Galvanizing
*CASEY-HEDGES CO., Chattanooga, Tenn. *pp. 60, 61*
—Hardening and Tempering
Garwood Bronze & Iron Works, Garwood, N. J.
—Lead
*QUIGLEY FURNACE SPECIALTIES CO. (Inc.). (''Q-Steel and Q-Alloy''), 26 Cortlandt St., New York, N. Y...*pp. 464, 465*
Sivyer Steel Casting Co, 37 Ave & Mitchell St., Milwaukee, Wis.
Swedish Crucible Steel Co. (''Cyro''), Butler & Grand Trunk Ry., Detroit, Mich.
—Solder Melting (Electric)
*GENERAL ELECTRIC CO., Schenectady, N. Y...*pp. 18, 19, 20, 21*

POTTERY MACHINERY
Crossley Machine Co. State & Monmouth Sts., Trenton, N. J.
Patterson Foundry & Machine Co., East Liverpool, Ohio
Tri-State Engrg. Co., 130-46 S. 5th St., Zanesville, Ohio

POWER TRANSMISSION MACHINERY
*ALLIS-CHALMERS MFG. CO., Milwaukee, Wis...*pp. 28, 29*
American Machinery & Construction Co., 103 W. Water St., Milwaukee, Wis.
AMERICAN TOOL & MACHINE CO., Boston 9, Mass...*p. 614*
Birmingham Iron Foundry, Derby, Conn.
Bond Foundry & Machine Co., Manheim, Pa.
*BROWN, A. & F. CO., 79 Barclay St., New York, N. Y...*p. 303*
*CALDWELL, H. W. & SON CO., 17th St. & Western Ave., Chicago, Ill...*p. 370*
*CALDWELL, W. E. CO., 340 E. Brandeis St., Louisville, Ky...*p. 323*
Codd Tank & Specialty Co., 117 S. Hanover St., Baltimore, Md.
Conway Clutch Co., 1950 West Sixth St., Cincinnati, Ohio
Cresson-Morris Co., 18th St. & Allegheny Ave., Philadelphia, Pa.
Cross Gear & Engine Co., 800-806 Bellevue Ave., Detroit, Mich.
Davis Foundry & Machine Works, Rome, Ga.
DODGE SALES & ENGINEERING CO., Mishawaka, Ind...*326, 327, 328, 329, 43 42*
Eastwood, Benjamin Co., 300 Straight St., Paterson, N. J.
FAIRBANKS CO., 416 Broome St., New York, N. Y...*pp. 174, 175*
FAIRBANKS, MORSE & CO., 900 S. Wabash Ave., Chicago, Ill...*p. 41*
Fairmount Foundry & Engineering Works, 43 Second Ave., Woonsocket, R. I.
*FALLS CLUTCH & MACHINERY CO., Cuyahoga Falls, Ohio..*p. 330*
FRANKLIN MACHINE CO., P. O. Address Box 1393, Providence, R. I...*p. 9*
G. E. Engineering Co. (Inc.), 22 Laight St., New York, N. Y.
*HILL CLUTCH CO., Cleveland, Ohio..*p. 331*

Digitized by Google

Holyoke Machine Co., Holyoke, Mass.
*JONES, W. A. FOUNDRY MACHINE CO., 4415 West Roosevelt Road, Chicago, Ill. *pp. 312, 313, 314, 315*
*LEFFEL, JAMES & CO., Springfield, Ohio *p. 33*
Lombard Iron Work & Supply Co., Augusta, Ga.
*MEDART PATENT PULLEY CO., St. Louis, Mo...*p. 333*
Meese & Gottfried Co., 660 Mission St., San Francisco, Cal.
Meriam Co., 8405 Detroit Ave., Cleveland, Ohio
Mey Chain Belt Co. (Inc.), 82 Washington St.,. Buffalo, N. Y
Minster Machine Co, Minster, Ohio
*MORSE CHAIN CO., Ithaca, N. Y...*p. 321*
National Foundry Mfg. & Supply Co., Williamsport, Pa.
Naylor Bros., Peekskill, N. Y.
Nordyke & Marmon Co., Indianapolis, Ind.
OILGEAR COMPANY, 60-62-64 27th St., Milwaukee, Wis...*p. 483*
*PHILADELPHIA DRYING MACHINERY CO., 3351 Stokeley St., Philadelphia, Pa. *p. 610*
Plamondon, A. Mfg. Co., 5300 Western Boul., Chicago, Ill.
POOLE ENGINEERING & MACHINE CO., Woodberry, Baltimore, Md...*pp. 316, 317*
Pryibil, P. Machine Co., 520 W. 41st St., New York, N. Y.
Pyott, Geo. W. Co., 1401 North Ave., Chicago. Ill
*ROYERSFORD FOUNDRY & MACHINE CO. (Inc.), 52 N. 5th St., Philadelphia, Pa...*pp. 346, 347*
Sellers, Wm. & Co. (Inc.), Philadelphia, Pa.
*SMIDTH, F. L. & CO., 50 Church St., New York, N. Y...*p. 604*
Webster Mfg. Co., 4500-4560 Cortlandt St., Chicago, Ill.
WELLER MFG. CO., 1820-1256 N. Kostner Ave., Chicago, Ill...*p. 381*
Wolf Co.. Chambersburg, Pa.
*WOOD'S, T. B., SONS CO., Chambersburg, Pa...*pp. 334, 335*
Yocom. Jas. & Son, 145 N. 2nd St., Philadelphia, Pa.

PRESERVATIVES (Wire Rope)
Cling-Surface Co., 1048 Niagara St., Buffalo, N. Y.
Ironsides Co., Columbus, Ohio

PRESSED STEEL PRODUCTS
(See Shapes, Pressed Steel)

PRESSES

—Arbor
ATLAS PRESS CO., 2000 N. Pitcher St., Kalamazoo, Mich...*p. 437*
Bartlett. Edwin E. (''Greenerd''), 41 Crown St., Nashua, N. H.
Canedy-Otto Mfg. Co., Chicago Heights, Ill.
ELMES, CHAS. F. ENGINEERING WORKS, 215 N. Morgan St., Chicago, Ill...*p. 591*
Geier Co. (''Geier''), 5102 St. Clair Ave., Cleveland, Ohio
Hannifan Mfg. Co., 621-31 S. Kilman Ave., Chicago, Ill.
HYDRAULIC PRESS MFG. CO. (The), Mount Gilead, Ohio..*p. 593*
Manufacturers Equipment Co. (''M. E. C.''), Waller Ave. & Fillmore St., Chicago, Ill.
METALWOOD MFG. CO., Detroit, Mich...*p. 594*
Nicholson, W. H. & Co., 12 Oregon St., Wilkes-Barre. Pa.
NILES-BEMENT-POND CO., 111 Broadway New York, N. Y ..*p. 470*
WATSON STILLMAN CO., 35 Church St., New York, N. Y...*p. 596*

—Baling
Ann Arbor Machine Co., Ann Arbor, Mich.
Birmingham Machine & Foundry Co., Birmingham, Ala.
Chicago Baling Press Mfg. Co., 805 S. LaSalle St., Chicago, Ill.
ELMES, CHAS. F. ENGINEERING WORKS, 215 N. Morgan St., Chicago, Ill...*p. 591*
FRANKLIN MACHINE CO., P. O. Address Box 1393, Providence, R. I...*p 9*
GALLAND-HENNING MFG. CO., Milwaukee, Wis...*p. 592*
HYDRAULIC PRESS MFG. CO. (The), Mount Gilead, Ohio..*p. 593*
*JOLLY, J. & W. (Inc.), Holyoke, Mass...*p. 32*
Logemann Bros. Co., 3120 Burleigh St., Milwaukee, Wis.
PHILADELPHIA DRYING MACHINERY CO., 3351 Stokeley St., Philadelphia, Pa. *p. 610*
WATSON-STILLMAN CO., 35 Church St., New York, N. Y...*p. 596*

—Banding
ELMES, CHAS. F. ENGINEERING WORKS, 215 N. Morgan St., Chicago, Ill...*p. 591*
HYDRAULIC PRESS MFG. CO. (The), Mount Gilead, Ohio..*p. 593*

—Blanking
*BLISS, E. W. CO., Brooklyn, N. Y...*pp. 438, 439*
Gilro Machine Co., Foot 9th Ave., Oakland, Cal.
HYDRAULIC PRESS MFG. CO. (The), Mount Gilead, Ohio..*p. 593*
Leffler, Charles & Co., 49-73 Clymer St.. Brooklyn, N. Y.
Meriden Press & Drop Co., 153 State St., Meriden, Conn.
TORRINGTON MFG. CO., Torrington, Conn. *p. 641*
V & O Press Co., Glendale, Brooklyn, N. Y.
WATSON-STILLMAN CO., 35 Church St., New York, N. Y...*p 596*
Zeh & Hahnemann Co., 182-200 Vanderpool St., Newark, N. J.

—Blocking and Briquetting
HYDRAULIC PRESS MFG. CO. (The), Mount Gilead, Ohio..*p. 593*

—Broaching
GALLAND-HENNING MFG. CO., Milwaukee, Wis...*p. 592*
HYDRAULIC PRESS MFG. CO. (The), Mount Gilead, Ohio..*p. 593*
METALWOOD MFG. CO., Detroit, Mich...*p. 594*
OILGEAR COMPANY, 60-62-64 27th St., Milwaukee, Wis...*p. 483*
V & O Press Co., Glendale, Brooklyn, N. Y.
VELCO MFG. CO. (Inc.), Greenfield, Mass. *p. 461*
WATSON STILLMAN CO., 35 Church St., New York, N. Y...*p. 596*

—Draw
*BLISS, E. W. CO., Brooklyn, N. Y...*pp. 438, 439*
ELMES, CHAS. F. ENGINEERING WORKS, 215 N. Morgan St., Chicago, Ill...*p. 591*
GALLAND-HENNING MFG. CO., Milwaukee, Wis...*p. 592*
Gilro Machine Co., Ft. of 9th Ave., Oakland, Cal.
HYDRAULIC PRESS MFG. CO. (The), Mount Gilead, Ohio..*p. 593*
NIAGARA MACHINE & TOOL WORKS, Buffalo, N. Y...*p. 443*
TORRINGTON MFG. CO., Torrington, Conn. *p. 641*
WATSON-STILLMAN CO., 35 Church St., New York, N. Y...*p. 596*

Digitized by Google

PRESSES (Continued)

—Drop

Meriden Press & Drop Co., 153 State St., Meriden, Conn.

—Drying

GALLAND-HENNING MFG. CO., Milwaukee, Wis...*p 592*

—Embossing

*BLISS, E. W. CO., Brooklyn, N. Y...*pp. 438, 439*

ELMES, CHAS. F. ENGINEERING WORKS, 215 N. Morgan St., Chicago, Ill...*p. 591*

HYDRAULIC PRESS MFG CO., Mount Gilead, Ohio..*p. 593*

ROBERTSON, JOHN, & CO., 133 Water St., Brooklyn, N. Y...*p. 595*

—Extruding

*BLISS E. W. CO., Brooklyn, N. Y...*pp. 438, 439*

BURROUGHS, CHARLES CO. (The), Newark, N. Y...*p. 590*

ELMES, CHAS. F. ENGINEERING WORKS, 215 N. Morgan St., Chicago, Ill...*p. 591*

HYDRAULIC PRESS MFG. CO. (The), Mount Gilead, Ohio..*p. 593*

ROBERTSON, JOHN, & CO., 133 Water St., Brooklyn, N. Y...*p. 595*

WATSON-STILLMAN CO., 35 Church St., New York, N. Y...*p. 596*

WOOD, R. D. & CO., Philadelphia, Pa...*p. 597*

—Filter

Blackburn-Smith Corp'n, 105 W. 40th St., New York, N. Y.

CARBONDALE MACHINE CO., Carbondale, Pa...*p. 630*

ELMES, CHAS. F. ENGINEERING WORKS, 215 N. Morgan St., Chicago, Ill...*p. 591*

Grupe Drier & Boiler Co., 325-331 E. 2nd St., Davenport, Iowa

LOUISVILLE DRYING MACHINERY CO., Louisville, Ky...*p. 608*

Perrin, William R. & Co., Room 504, 343 So. Dearborn St., Chicago, Ill.

Provost Engineering Corp'n, 50 Church St., Brooklyn, N. Y.

Shriver T. & Co., 844 Hamilton St., Harrison, N. J.

Simplex Ejector Co., 1050 Randolph St., Chicago, Ill.

United Filters Corpn., 65 Broadway, New York, N. Y.

*VOGT, HENRY MACHINE CO., Louisville, Ky...*pp. 632, 633*

*WORTHINGTON PUMP & MACHINERY CORP'N, 115 Broadway, New York, N. Y. *pp. 44, 45, 46, 47*

—Filter (Laboratory)

Perrin, William R. & Co., Room 504, 343 South Dearborn St., Chicago, Ill.

—Flanging

ELMES, CHAS. F. ENGINEERING WORKS, 215 N. Morgan St., Chicago, Ill...*p. 591*

—Foot and Hand

*BLISS, E. W. CO., Brooklyn, N. Y. *pp. 438, 439*

Kidder, J. F. Mfg. Co., Burlington, Vt.

Partridge, E. O., 2047-2049 W. Lake St., Chicago, Ill.

*ROYERSFORD FOUNDRY & MACHINE Co. (Inc.), 52 N. 5th St., Philadelphia, Pa. *pp. 346, 347*

V & O Press Co., Glendale, Brooklyn, N. Y.

—Forging

*BLISS, E. W. CO., Brooklyn, N. Y...*pp. 438, 439*

Camden Iron Works, Camden, N. J.

ELMES, CHAS. F. ENGINEERING WORKS, 215 N. Morgan St., Chicago, Ill...*p. 591*

Garrison, A. Foundry Co., South 9th & Bingham Sts, S. S., Pittsburgh, Pa.

NILES-BEMENT-POND CO., 111 Broadway, New York, N. Y...*p 470*

HYDRAULIC PRESS MFG. CO. (The), Mount Gilead, Ohio..*p. 593*

ROBERTSON, JOHN & CO., 133 Water St., Brooklyn, N. Y...*p. 595*

WATSON-STILLMAN CO., 35 Church St., New York, N. Y...*p. 596*

WOOD, R. D. & CO., Philadelphia, Pa...*p. 597*

—Forging (Steam-Hydraulic)

Mesta Machine Co., Box 1124, Pittsburgh, Pa.

NILES-BEMENT-POND CO., 111 Broadway, New York, N. Y...*p. 470*

—Forming

Streine Tool & Mfg. Co., New Bremen, Ohio

—Hot and Cold Plate

HYDRAULIC PRESS MFG. CO., Mount Gilead, Ohio..*p. 593*

—Hydraulic

Aldrich Pump Co., Allentown, Pa.

BERTSCH & CO., Cambridge City, Ind...*p. 442*

Birdsboro Steel Foundry & Machine Co., Birdsboro, Pa.

BUCKEYE IRON & BRASS WORKS, Dayton, Ohio..*p. 168*

BURROUGHS, CHARLES CO. (The), Newark, N. J...*p. 590*

Chambersburg Engineering Co., Chambersburg, Pa.

Dudgeon, Richard Broome & Columbia Sts., New York, N. Y.

Dunning & Boschert Press Co. (Inc.), 329 W. Water St., Syracuse, N. Y.

ELMES, CHAS. F. ENGINEERING WORKS, 215 N. Morgan St., Chicago, Ill...*p. 591*

*FALLS CLUTCH & MACHINERY CO., Cuyahoga Falls, Ohio..*p. 330*

Farquhar, A. B. Co. (Ltd.), York, Pa.

GALLAND-HENNING MFG. CO., Milwaukee, Wis...*p. 592*

Gerdes Co. (Inc.), 30 Church St., New York, N. Y.

Hintz Mfg. Co., 1100-1110 S. Kilbourn Ave., Chicago, Ill.

Holyoke Machine Co., Holyoke, Mass.

HYDRAULIC PRESS MFG. CO., Mount Gilead, Ohio..*p. 593*

Lourie Mfg. Co., Springfield, Ill.

McCall Machine Works, 573 Lyell Ave., Rochester, N. Y.

Mesta Machine Co., Box 1124, Pittsburgh, Pa.

METALWOOD MFG. CO., Detroit, Mich...*p. 594*

NILES-BEMENT-POND CO., 111 Broadway, New York, N. Y...*p. 470*

OILGEAR COMPANY, 60-62-64 27th St., Milwaukee, Wis...*p 483*

OLSEN, TINIUS TESTING MACHINE CO., 500 N. 12th St., Philadelphia, Pa...*pp. 265, 266, 267*

Perrin, William R. & Co., Room 504, 343 So. Dearborn St., Chicago, Ill.

PHILADELPHIA DRYING MACHINERY CO., 3351 Stokeley St., Philadelphia, Pa. *610*

RIEHLE BROS. TESTING MACHINE CO., 1424 N. 9th St., Philadelphia, Pa..*p. 268*

ROBERTSON, JOHN & CO., 133 Water St., Brooklyn, N. Y...*p. 595*

Shriver, T. & Co., 844 Hamilton St, Harrison, N. J.

*U. S. CAST IRON PIPE & FOUNDRY CO., Burlington, N. J...*pp. 232, 233*

Utility Mfg. Co., Cudahy, Wis.

WATSON STILLMAN CO., 35 Church St., New York, N. Y...*p. 596*

Digitized by Google

West Tire Setter Co., Rochester, N. Y.
WOOD, R. D. & CO., Philadelphia, Pa...*p. 597*

—Hydro Pneumatic
HYDRAULIC PRESS MFG. CO. (The), Mount Gilead, Ohio..*p. 593*
METALWOOD MFG. CO., Detroit, Mich...*p. 594*

—Hydrostatic Testing
METALWOOD MFG. CO., Detroit, Mich...*p. 495*
ROBERTSON, JOHN & CO., 133 Water St., Brooklyn, N. Y...*p. 595*

—Inclinable
*BLISS, E. W. CO., Brooklyn, N. Y...*pp. 438, 439*
Cameron Can Machinery Co., 240 North Ashland Ave., Chicago, Ill.
Leffler, Charles & Co., 49-78 Clymer St., Brooklyn, N. Y.
Niagara Machine & Tool Works, Buffalo, N. Y...*p. 443*
NILES-BEMENT-POND CO., 111 Broadway, New York, N. Y...*p. 470*
Rockford Iron Works, Rockford, Ill.
V & O Press Co., Glendale, Brooklyn, N. Y.
Willard Middletown Machine Co., Cincinnati, Ohio
Zeh & Hahnemann Co., 182-200 Vanderpool St., Newark, N. J.

—Juice, Oil, Fat, etc.
HYDRAULIC PRESS MFG. CO. (The), Mount Gilead, Ohio..*p. 593*

—Lead Encasing
ROBERTSON, JOHN & CO., 133 Water St., Brooklyn, N. Y...*p. 595*

—Lead Molding
HYDRAULIC PRESS MFG. CO., Mount Gilead, Ohio..*p. 593*

—Percussion
ELMES, CHAS. F. ENGINEERING WORKS, 215 N. Morgan St., Chicago, Ill...*p. 591*
Zeh & Hahnemann Co., 182-200 Vanderpool St., Newark, N. J.

—Plastic Molding
HYDRAULIC PRESS MFG. CO. (The), Mount Gilead, Ohio..*p. 593*

—Platen (Hydraulic)
BURROUGHS, CHARLES CO. (The), Newark, N. J...*p. 590*
*FALLS CLUTCH & MACHINERY CO., Cuyahoga Falls, Ohio..*p. 330*
GALLAND-HENNING MFG. CO., Milwaukee, Wis...*p. 592*

—Power
Ams, Max Machine Co., 101 Park Ave., New York, N. Y.
Atlas Machine Co., 140 Manhan St., Waterbury, Conn.
BERTSCH & CO., Cambridge City, Ind...*p. 442*
*BLISS, E. W. CO.. Brooklyn, N. Y...*pp 438, 439*
ELMES, CHAS. F. ENGINEERING WORKS, 215 N. Morgan St., Chicago, Ill...*p. 591*
Haysman & Co., 801-805 E. Pratt St., Baltimore, Md.
Kane & Roach, Niagara & Shonnard Sts., Syracuse, N. Y.
Loy & Nawrath Co., 21-29 Runyon St., Newark, N. J.
Lucas Machine Tool Co., 523 E. 99th St., Cleveland, Ohio
Manville, E. J. Machine Co., Waterbury, Conn.
Michigan Machine Tool & Fdry. Co., Ypsilanti, Mich.
NILES-BEMENT-POND CO., 111 Broadway, New Yerk, N. Y...*p. 470*
Perkins Machine Co. ("Perkins"), Warren, Mass.
Robinson, J. M. Mfg. Co., Cincinnati, Ohio
Rockford Iron Works, Rockford, Ill,
Standard Machinery Co., Auburn, R. I.
Stoll, D. H. Co., 26 Lansing St., Buffalo, N. Y.
Thomas Spacing Machine Co., 1226 Fulton Bldg., Pittsburgh, Pa.
TORRINGTON MFG. CO., Torrington, Conn. *p. 641*
V & O Press Co., Glendale, Brooklyn, N. Y.
Walsh Press & Die Co., 4700 W. Kinzie St., Chicago, Ill.
Waterbury Farrel Foundry & Machine Co., Waterbury, Conn.
Willard Middletown Machine Co., Cincinnati, Ohio
Zeh & Hahnemann Co., 182-200 Vanderpool St., Newark, N. J.

—Printing
American Type Founders Co., 300 Communipaw Ave., Jersey City, N. J.
Bryant Co, 1025 South Menard Ave.. Chicago, Ill
Hoe, R. & Co., 504-520 Grand St., New York, N. Y.
National Machine Co., 111-133 Sheldon St., Hartford, Conn.
Premier & Potter Ptg. Press Co ("Premier"), Derby, Conn.

—Punching and Trimming
Baird Machine Co.. Bridgeport, Conn.
BERTSCH & CO., Cambridge City, Ind...*p. 442*
*BLISS, E. W. CO., Brooklyn, N. Y...*pp. 438, 439*
Cedar Rapids Fdry & Machine Co., 901-998 2nd Ave.. W. Cedar Rapids, Iowa
Cleveland Punch & Shear Works Co., 3917 St. Clair Ave., Cleveland, Ohio
Enterprise Machinery Co. ("Emco"), 30 S. Clinton St., Chicago, Ill.
Erie Foundry Co., Erie, Pa.
Ferracute Machine Co.. Bridgeton, N. J.
Heartley Machine, Variety Iron & Tool Works, Summit & Locust Sts, Toledo, Ohio
Massillon Foundry & Machine Co., Massillon, Ohio
NIAGARA MACHINE & TOOL WORKS, Buffalo, N. Y...*p. 443*
NILES-BEMENT-POND CO., 111 Boadway, New York, N. Y...*p. 470*
*ROYERSFORD FOUNDRY & MACHINE CO. (Inc.), 52 N. 5th St., Philadelphia, Pa...*pp. 346, 347*
Taylor-Shantz Co., 478-86 St. Paul St., Rochester, N. Y.
V & O Press Co., Glendale, Brooklyn, N. Y.
WOOD, R. D. & CO., Philadelphia, Pa...*p. 597*

—Screw
*BLISS, E. W. CO.. Brooklyn, N. Y...*pp. 438, 439*
ELMES, CHAS. F. ENGINEERING WORKS, 215 N. Morgan St., Chicago, Ill...*p. 591*
Manhattan Machine & Tool Works, 50 Market Ave., N. W., Grand Rapids, Mich.
Manley Mfg. Co. ("Manley"), York, Pa.
PHILADELPHIA DRYING MACHINERY CO., 3351 Stokeley St., Philadelphia, Pa. *p. 610*
Zeh & Hahnemann Co., 182-200 Vanderpool St., Newark, N. J.

—Sheet Metal Working
BERTSCH & CO., Cambridge City, Ind...*p. 442*
*BLISS, E. W. CO., Brooklyn, N. Y...*pp. 438, 439*
ELMES, CHAS. F. ENGINEERING WORKS, 215 N. Morgan St., Chicago, Ill...*p. 591*

Pr

Digitized by Google

PRESSES (Continued)
Ferracute Machine Co., Bridgeton, N. J.
McDonald Machine Co., 7600 So. Racine Ave., Chicago, Ill.
NIAGARA MACHINE & TOOL WORKS, Buffalo, N Y...*p. 443*
Toledo Machine & Tool Co., Toledo, Ohio

—Stamping
*BLISS, E. W. CO., Brooklyn, N. Y...*pp. 438, 439*
ELMES, CHAS. F. ENGINEERING WORKS, 215 N. Morgan St., Chcago, Ill...*p. 591*
Ferracute Machine Co., Bridgeton, N. J.
Mason, Jos. M. Machine Co. (Inc.), 2305-13 N. Marshall St., Philadelphia, Pa.
V & O Press Co., Glendale, Brooklyn, N. Y.

—Straightening
ELMES, CHAS. F. ENGINEERING WORKS, 215 N. Morgan St., Chicago, Ill...*p. 591*
HYDRAULIC PRESS MFG. CO. (The), Mount Gilead, Ohio..*p. 593*
METALWOOD MFG. CO., Detroit, Mich...*p. 594*

—Toggle
NIAGARA MACHINE & TOOL WORKS, Buffalo, N. Y...*p. 443*

—Wheel (Hydraulic)
Chambersburg Engineering Co., Chambersburg, Pa.
ELMES, CHAS. F. ENGINEERING WORKS, 215 N. Morgan St., Chicago, Ill...*p. 591*
GALLAND-HENNING MFG. CO., Milwaukee, Wis...*p. 592*
HYDRAULIC PRESS MFG. CO. (The), Mount Gilead, Ohio..*p. 593*
Lourie Mfg. Co., Springfield, Ill.
METALWOOD MFG. CO., Detroit, Mich...*p. 594*
NILES-BEMENT-POND CO., 111 Broadway, New York, N. Y...*p. 470*
WATSON-STILLMAN CO., 35 Church St., New York, N. Y...*p. 596*
WOOD, R. D. & CO., Philadelphia, Pa...*p. 597*

PRESSURE INDICATORS, REGULATORS, ETC.
(See Indicators, Regulators, etc., Pressure)

PRINTERS' MACHINERY
Morgans & Wilcox Mfg. Co., Middletown, N. Y.
National Machine Co., 111-133 Sheldon St., Hartford, Conn.

PRODUCERS, GAS
AMERICAN INDUSTRAIAL FURNACE CORP'N, 10 Post Office Sq., Boston, Mass. *p. 528*
Amsler-Morton Co., Blawnax, Pa.,
Bartlett Hayward Co., Baltimore, Md.
Jacobson Engineering Co., Albany, N. Y.
Duff Patents Co. (Inc.), 918 Frick Bldg., Pittsburgh, Pa.
Gas Producer and Engineering Corp'n ("Galusha"), 115 Broad St., New York, N. Y.
General Reduction, Gas & By Products Co., 49 Wall St., New York, N. Y.
Hagan, George J. Co., 401 Peoples Bank Bldg., Pittsburgh, Pa.
International Clay Machinery Co., 1057 Bohlander Ave., Dayton, Ohio
LEBANON BOILER WORKS (J. K. Petty & Co., Inc.), 6 So. 15th St., Philadelphia, Pa...*pp. 78, 79*
MILWAUKEE RELIANCE BOILER WORKS ("Sharp-Bassett"), Milwaukee, Wis...*p. 148*
Morgan Construction Co., Worcester, Mass.
Otto Engine Mfg. Co., 3215 Walnut St., Philadelphia, Pa.
SMITH GAS ENGINEERING CO., Dayton, Ohio..*p. 94*,
Syracuse Industrial Gas Co. ("Syracuse"), 206 McCarthy Bldg., Syracuse, N. Y.
Western Gas Construction Co., Fort Wayne, Ind.
WOOD, R. D. & CO., Philadelphia, Pa...*p. 597*

—Hand Operated
MILWAUKEE RELIANCE BOILER WORKS ("Sharp-Bassett"), Milwaukee, Wis...*p. 148*

—Suction
Amsler-Morton Co., Blawnax, Pa.
Gas Producer and Engineering Corp'n ("Galusha"), 115 Broad St., New York, N. Y.
MILWAUKEE RELIANCE BOILER WORKS ("Sharp-Bassett"), Milwaukee, Wis...*p. 148*

PROFILING MACHINES
Leland-Gifford Co., Worcester, Mass.
Luster-Jordan Co. (Inc.), W. Washington, Norristown, Pa.
PRATT & WHITNEY CO., 111 Broadway, New York, N. Y...*p. 471*

PROPELLERS
AMERICAN MANGANESE BRONZE CO., Holmesburg, Philadelphia, Pa...*p. 415*
Columbian Bronze Corp'n, 50 Church St., New York, N. Y.
Fox Hill Foundry, Clinton, Grand & 12th Sts., Hoboken, N. J.
Thacher Propeller & Foundry Corp'n ("Thacher," "Dyson"), Albany, N. Y.

PSCHROMETERS
*FOXBORO CO. (Inc.), Foxboro, Mass...*p. 293*

PULLEYS

—Cork Insert
Cork Insert Co., 164 Federal St., Boston, Mass.

—Fibre
*CONTINENTAL FIBRE CO., Newark, Del. *p. 418*
DIAMOND STATE FIBRE CO., Bridgeport, Pa...*p. 420*

—Friction Clutch
*ALLIS-CHALMERS MFG. CO., Milwaukee, Wis...*pp. 28, 29*
AMERICAN TOOL & MACHINE CO., Boston 9, Mass...*p. 614*
Bauroth Brothers, Springfield, Ohio
*BROWN, A. & F. CO., 79 Barclay St., New York, N. Y...*p. 303*
*CALDWELL, H. W. & SON CO., 17th St. & Western Ave., Chicago, Ill...*p. 370*
*CALDWELL, W. E. Co., 340 E. Brandeis St., Louisville, Ky...*p. 328*
CHICAGO PULLEY & SHAFTING CO., 30 So. Clinton St., Chicago, Ill...*pp. 324, 325*
CONNELLSVILLE MFG. & MINE SUPPLY CO., Connellsville, Pa...*p. 384*
Conway Clutch Co., 1950 West Sixth St., Cincinnati, Ohio
DODGE SALES & ENGINEERING CO., Mishawaka, Ind...*42, 43, 326, 327, 328, 329*
Eastern Machinery Co., New Haven, Conn.
Edgemont Machine Co., 2200 Home Ave., Dayton, Ohio
FAIRBANKS, MORSE & CO., 900 S. Wabash Ave., Chicago, Ill...*p. 41*
*FALLS CLUTCH & MACHINERY CO., Cuyahoga Falls, Ohio..*p. 330*
Fremont Clutch Co., Fremont, Ohio
Hanson Clutch & Machinery Co., Tiffin, Ohio
Havana Mfg. Co., Havana, Ill.
Hess-Snyder Co., Massillon, Ohio
*HILL CLUTCH CO ("Smith Type"), Cleveland, Ohio..*p. 331*
JEFFREY MFG. CO., 904 N. 4th St., Columbus, Ohio..*pp. 376, 377*
*JOHNSON, CARLYLE MACHINE CO., Manchester, Conn...*p. 332*

Digitized by Google

JONES, W. A. FOUNDRY & MACHINE CO. (''Lemley''), 4415 West Roosevelt Road, Chicago, Ill...*pp. 312, 313, 314, 315*
McMahon & Co., Worcester, Mass.
Mason, Volney W. & Co. (Inc.), 2 Lafayette St., Providence, R. I.
*MEDART PATENT PULLEY CO., St. Louis, Mo...*p. 333*
Muncie Oil Engine Co., 500 America Blvd., Muncie, Ind.
National Clutch Co., 1859 Fulton St., New York, N. Y.
Plamondon, A. Mfg. Co., 5300 Western Boul., Chicago, Ill.
REEVES PULLEY CO., Columbus, Ind...*p. 319*
Standard Pulley Co., 1738 Powers St., Cincinnati, Ohio
Twin Disc Clutch Co., Racine, Wis.
WELLER MFG. CO., 1820-1856 N. Kostner Ave., Chicago, Ill...*p. 381*
*WOOD'S, T. B. SONS CO., Chambersburg, Pa...*pp. 334, 335*

—Governor

Cedar Rapids Foundry & Machine Co., 901-998 2nd Ave., W., Cedar Rapids, Iowa
*FALLS CLUTCH & MACHINERY CO., Cuyahoga Falls, Ohio..*p. 330*

—Iron

*ALLIS-CHALMERS MFG. CO., Milwaukee, Wis...*pp. 28, 29*
AMERICAN TOOL & MACHINE CO., Boston 9, Mass...*p. 614*
*BROWN, A. & F. CO., 79 Barclay St., New York, N. Y...*p. 303*
*CALDWELL, H. W. & SON CO., 17th St. & Western Ave., Chicago, Ill...*p. 370*
*CALDWELL, W. E. CO., 340 E. Brandeis St., Louisville, Ky...*p 328*
California Belting Co. (Inc.), 1459-61-63 Mission St., San Francisco, Cal.
Cedar Rapids Fdry. & Machine Co., 901-998 2nd Ave., W., Cedar Rapids, Iowa
CHICAGO PULLEY & SHAFTING CO., 30 So. Clinton St., Chicago, Ill...*pp. 324, 325*
Christiana Machine Co., Christiana, Pa.
DODGE SALES & ENGINEERING CO. (''Standard Split''), Mishawaka, Ind...*pp. 42, 43, 327, 328, 329*
Ehrsam, J. B. & Sons Mfg. Co., Enterprise, Kan.
*FALLS CLUTCH & MACHINERY CO., Cuyahoga Falls, Ohio..*p. 330*
Havana Mfg. Co., Havana, Ill.
Hess-Snyder Co., Massillon, Ohio
*HILL CLUTCH CO., Cleveland, Ohio..*p. 331*
JEFFREY MFG. CO., 904 N. 4th St., Columbus, Ohio..*pp. 376, 377*
*JOHNS, W. A. FOUNDRY & MACHINE CO., 4415 West Roosevelt Road, Chicago, Ill...*pp. 312, 313, 314, 315*
*MEDART PATENT PULLEY CO., St. Louis, Mo...*p. 333*
Naylor Bros., Peekskill, N. Y.
Nordyke & Marmon Co., Indianapolis, Ind.
POOLE ENGINEERING & MACHINE CO., Woodberry, Baltimore, Md...*pp. 316, 317*
Pyott, Geo. W. Co., 1401 North Ave., Chicago, Ill.
Pyott Foundry Co., 328 N. Sangamon St., Chicago, Ill.
Standard Pulley Co., 1738 Powers St., Cincinnati, Ohio
*WOOD'S, T. B. SONS CO., Chambersburg, Pa...*pp, 334, 335*

—Iron (Cork-Insert)

*WOOD'S, T. B. SONS CO., Chambersburg, Pa...*pp. 334, 335*

—Leather Covered

Buffalo Pulley & Caster Co., 182 Breckenridge St., Buffalo, N. Y.

—Loose

*BROWN, A. & F. CO., 79 Barclay St., New York, N. Y...*p. 303*
CHICAGO PULLEY & SHAFTING CO., 30 So. Clinton St., Chicago, Ill...*pp. 324, 325*
*FALLS CLUTCH & MACHINERY CO., Cuyahoga Falls, Ohio..*p. 330*
WILMARTH & MORMAN CO. (''Nelson Patent''), Grand Rapids, Mich...*p. 490*

—Loose (Ball Bearing)

*JONES, W. A. FOUNDRY & MACHINE CO., 4415 West Roosevelt Road, Chicago, Ill. *pp. 312, 313, 314, 315*

—Motor

AMERICAN PULLEY CO., 4200 Wissahickon Ave., Philadelphia, Pa...*p. 322*
*BROWN A. & F. CO., 79 Barclay St., New York, N. Y...*p. 303*
DODGE SALES & ENGINEERING CO., Mishawaka, Ind...*pp. 42, 43, 326, 327, 328, 329*
*FALLS CLUTCH & MACHINERY CO., Cuyahoga Falls, Ohio..*p. 330*
*HILL CLUTCH CO., Cleveland, Ohio..*p. 331*
*JONES, W. A. FOUNDRY & MACHINE CO., 4415 West Roosevelt Road, Chicago, Ill...*pp. 312, 313, 314, 315*
Karge Baker Corp'n (''Karge''), Phoenix, N. Y.
Ohio Valley Pulley Works, Maysville, Ky.
Saginaw Mfg. Co. (''Gilbert''), Saginaw, Mich.
*WOOD'S, T. B. SONS CO., Chambersburg, Pa...*pp. 334, 335*

—Paper

*JONES, W. A. FOUNDRY & MACHINE CO., 4415 West Roosevelt Road, Chicago, Ill...*pp. 312, 313, 314, 315*
Rockwood Mfg. Co., Indianapolis, Ind.

—Steel

AMERICAN PULLEY CO. (''American Steel Split''), 4200 Wissahickon Ave., Philadelphia, Pa...*p. 322*
*CALDWELL, H. W. & SON CO., 17th St. & Western Ave., Chicago, Ill...*p. 370*
CHICAGO PULLEY & SHAFTING CO., 30 So. Clinton St., Chicago. Ill...*pp. 324, 325*
Dick, R. & J. Co. (Inc.), Passaic, N. J.
DODGE SALES & ENGINEERING CO. (''Oneida,'' ''Keystone,'' ''National''), Mishawaka, Ind...*pp. 42, 43, 326, 327, 328, 329*
Horton Machine Works (Inc.), 104-106 W. Fourth St., Elmira, N. Y.
*JONES, W. A. FOUNDRY & MACHINE CO., 4415 W. Roosevelt Road, Chicago, Ill...*pp. 312, 313, 314, 315*
*MEDART PATENT PULLEY CO., St. Louis, Mo...*p. 333*
Philips Pressed Steel Pulley Works, Chestnut Hill, Pa.
WELLER MFG. CO., 1820-1856 N. Kostner Ave., Chicago, Ill...*p. 381*

—Wood

*CALDWELL, H. W. & SON CO., 17th St. & Western Ave., Chicago, Ill...*p. 370*
CHICAGO PULLEY & SHAFTING CO., 30 So. Clinton St. Chicago, Ill...*pp. 324, 325*
Detroit Pulley Co. (''Paul''), 1331 Bellevue Ave., Detroit, Mich.
DODGE SALES & ENGINEERING CO. (''Independent''), Mishawaka, Ind...*pp. 42, 43, 326, 327, 328, 329*
Eclipse Wood Pulley Co. (Inc.), Berlin, Pa.
Excelsior Pulley Co. (''Excelsior''), 21 Water St., Cuba, N. Y.

Pu

Digitized by Google

PULLEYS (Continued)

Forster, John M. Co., 110 Mill St., Rochester, N. Y.
*JONES, W. A. FOUNDRY & MACHINE CO., 4415 West Roosevelt Road, Chicago, Ill. *pp. 312, 313, 314, 315*
*MEDART PATENT PULLEY CO., St. Louis, Mo...*p. 333*
Menasha Wood Split Pulley Co. (''Lawson''), Menasha, Wis.
Ohio Valley Pulley Works, Mayaville, Ky.
Oneida Wood Pulley Co., Oneida, N. Y.
Reading Wood Pulley Co., 11th & Muhlenberg Sts., Reading, Pa.
REEVES PULLEY CO., Columbus, Ind...*p. 319*
Saginaw Mfg. Co. (''Gilbert''), Saginaw, Mich.
WELLER MFG. CO., 1820-1856 N. Kostner Ave., Chicago, Ill...*p. 331*

—Wood (Iron Center)

Ohio Valley Pulley Works, Mayaville, Ky.
Reading Wood Pulley Co., 11th & Muhlenberg Sts., Reading, Pa.
REEVES PULLEY CO., Columbus, Ind...*p. 319*
Saginaw Mfg. Co. (''Gilbert''), Saginaw, Mich.

PULLING TABLES (For Annealing Furnaces)

Kenworthy, Charles F. (Inc.), Waterbury, Conn.

PULP MACHINERY
(See Paper Pulp Machinery)

PULVERIZED COAL EQUIPMENT

Aero Pulverizer Co., 12 Broadway, New York, N. Y.
BONNOT CO., Canton, Ohio...*p. 598*
Clark Dust Collecting Co., Fisher Bldg., Chicago, Ill.
Combustion Engineering Corp'n (''Lopulco''), Broad St., New York, N. Y.
*ERIE CITY IRON WORKS, Erie, Pa...*pp. 66, 67*
Fuller Engineering Co., Allentown National Bank Bldg., Allentown, Pa.
*FULLER-LEHIGH CO., Fullerton, Pa...*p. 128*
Grindle Fuel Equipment Co., 1901-1911 S. Rockwell St., Chicago, Ill.
McCool Co., 1796 East 90th St., Cleveland, O.
Metals Production Equipment Co., 105 W. 40th St., New York, N. Y.
Northern Blower Co., W. 65th & Dennison Ave., Cleveland, Ohio
Powdered Coal Engrg. & Equipment Co., 2415 Washington Blvd., Chicago, Ill.
*QUIGLEY FURNACE SPECIALTIES CO. (Inc.) (''Quigley System''), 26 Cortlandt St., New York, N. Y...*pp. 129, 138, 139*
Raymond Bros. Impact Pulverizer Co., 1329 N. Branch St., Chicago, Ill.
RUGGLES-COLES ENGINEERING CORP'N, 120 Broadway, New York, N. Y...*p. 609*
*SMIDTH, F. L. & CO., 50 Church St., New York, N. Y...*p. 604*
Stroud, E. H. & Co., 928-924 Fullerton Ave., Chicago, Ill.

PULVERIZERS

Abbe Engrg. Co., 220 Broadway, New York, N. Y.
*BROWN, A. & F. CO. (''Cogswell Mill'') 79 Barclay St., New York, N. Y...*p. 303*
DEVINE, J. P. CO., 1375 Clinton St., Buffalo, N. Y...*pp. 606, 607*
Excelsior Tool & Machine Co, East St. Louis, Ill.
Hardinge Conical Mill Co., 120 Broadway, New York, N. Y.
JEFFREY MFG. CO., 904 N. 4th St., Columbus, Ohio..*pp. 376, 377*
Raymond Bros. Impact Pulverizer Co., 1329 N. Branch St., Chicago, Ill.
*SMIDTH, F. L. & CO., 50 Church St., New York, N. Y...*p. 604*
Stevenson Co, Wellsville, Ohio
Sturtevant Mill Co., Harrison Sq., Boston, Mass.
United States & Cuban Allied Works Engrg. Corp'n, 50 Church St., New York, N. Y.

—Cement Materials

*ALLIS-CHALMERS MFG. CO., Milwaukee, Wis...*pp. 28, 29*
BARTLETT, C. O. & SNOW CO., Cleveland, Ohio..*p. 367*
Bradley Pulverizer Co., Allentown, Pa.
*FULLER-LEHIGH CO., Fullerton, Pa...*p. 128*
JEFFREY MFG. CO., 904 N. 4th St., Columbus, Ohio..*pp. 376, 375*
STURTEVANT MILL CO., Harrison Sp., Boston, 22, Mass...*pp. 600, 601*
WILLIAMS PATENT CRUSHER & PULVERIZER CO., St. Louis, Mo...*pp. 602, 603*

—Chemical Materials

*BROWN, A. & F CO., (''Cogswell Mill'') 79 Barclay St., New York, N. Y...*p. 303*

—Clay & Shale

Fernholtz Brick Machinery Co., 1446 S. Vandeventer Ave., St. Louis, Mo.

—Coal

Aero Pulverizer Co., 120 Broadway, New York, N. Y.
American Pulverizer Co., 18th & Austin Sts., St. Louis, Mo.
BARTLETT, C. O. & SNOW CO., Cleveland, Ohio..*p. 367*
BONNOT CO., Canton, Ohio..*p. 598*
Bradley Pulverizer Co., Allentown, Pa.
*ERIE CITY IRON WORKS, Erie Pa...*p. 66, 67*
*FULLER-LEHIGH CO., Fullerton, Pa...*p. 128*
Hiller, Joseph L., 21 South Twelfth St., Philadelphia, Pa.
JEFFREY MFG. CO., 904 N. 4th St., Columbus, Ohio..*pp. 376, 377*
McCool Co., 1796 East 90th St., Cleveland, Ohio
Marathon Mill Machinery Works, 303 West University Ave., Champaign, Ill.
Mashek Engineering Co., 90 West St., New York, N. Y.
Pennsylvania Crusher Co., 1324 Stephen Girard Blg., Philadelphia, Pa.
WILLIAMS PATENT CRUSHER & PULVERIZER CO., St. Louis, Mo...*pp. 602, 603*

—Limestone

*ALLIS-CHALMERS MFG. CO., Milwaukee, Wis...*pp. 28, 29*
BARTLETT C. O. & SNOW., Cleveland, Ohio..*p. 367*
BONNOT CO., Canton, Ohio..*p. 598*
Bradley Pulverizer Co., Allentown, Pa.
*FULLER-LEHIGH CO., Fullerton, Pa...*p. 128*
JEFFREY MFG. CO., 904 N. 4th St., Columbus, Ohio..*pp. 376, 377*
Pennsylvania Crusher Co., 1324 Stephen Girard Building, Philadelphia, Pa.
STURTEVANT MILL CO., Harrison Sq., Boston 22, Mass...*pp. 600, 601*
WILLIAMS PATENT CRUSHER & PULVERIZER CO., St. Louis, Mo...*pp. 602, 603*

—Phosphate Rock

*ALLIS-CHALMERS MFG. CO., Milwaukee, Wis...*pp. 28, 29*
BARTLETT, C. O. & SNOW CO., Cleveland, Ohio..*p. 405*

Digitized by Google

BONNOT CO., Canton, Ohio..*p. 598*
Bradley Pulverizer Co., Allentown, Pa.
*FULLER-LEHIGH CO., Fullerton, Pa...*p. 128*
JEFFREY MFG. CO., 904 N. 4th St., Columbus, Ohio..*pp. 376, 377*
STURTEVANT MILL CO., Harrison Sq., Boston 22, Mass...*pp. 600, 601*

—Pneumatic
St. John Grate Bar Co., Machy. Dept., The Bourse, Philadelphia, Pa.

—Refractory Materials
American Pulverizer Co., 18th & Austin Sts., St. Louis, Mo.
BARTLETT, C. O. & SNOW CO., Cleveland, Ohio..*p. 367*
*FULLER-LEHIGH CO., Fullerton, Pa...*p. 128*
JEFFREY MFG. CO., 904 N. 4th St., Columbus, Ohio..*pp. 376, 377*
STURTEVANT MILL CO., Harrison Sq., Boston 22, Mass...*pp. 600, 601*

PULVERIZING AND AIR SEPARATING MACHINERY
BONNOT CO., Canton, Ohio...*p. 598*
Bradley Pulverizer Co., Allentown, Pa.
*FULLER-LEHIGH CO., Fullerton, Pa...*p. 128*
Gruendler Patent Crusher & Pulverizer Co., 928 N. First St., St. Louis, Mo.
Raymond Bros. Impact Pulverizer Co., 1329 N. Branch St., Chicago Ill,
Stroud, E. H. & Co., 928-934 Fullerton Ave., Chicago, Ill.
STURTEVANT MILL CO., Harrison Sq., Boston 22, Mass...*pp. 600, 601*
WILLIAMS PATENT CRUSHER & PULVERIVER CO., St. Louis, Mo...*pp. 602, 603*

PUMP GOVERNORS, LINERS, VALVES, ETC.
(See Governors, Valves, Etc., Pump)

PUMPING ENGINES
(See Engines, Pumping)

PUMPING OUTFITS
*ALLIS-CHALMERS MFG. CO., Milwaukee, Wis...*pp. 28, 29*
Edson Mfg. Co., 377 Broadway, Boston, Mass.
ECONOMY PUMPING MACHINERY CO., 104-118 No. Curtis St., Chicago, Ill...*p. 568*
FAIRBANKS, MORSE & CO., 900 S. Wabash Ave., Chicago, Ill...*p. 41*
*GOULDS MFG. CO., Seneca Falls, N. Y. *pp. 570, 571, 572, 573*
Hinman, D. A. & Co., Sandwich, Ill.
Ideal Engine Co., Lansing, Mich.
NATIONAL SUPPLY CO., Toledo, Ohio..*pp. 648, 649*
NORTHERN FIRE APPARATUS CO., 2422 University Ave., S. E., Minneapolis, Minn. *p. 577*
*NOVO ENGINE CO, Lansing, Mich...*pp. 586, 587*
Pattin Bros. Co., Marietta, Ohio
Rider-Ericsson Engine Co., 20 Murray St., New York, N. Y.
Schramm, Chris. D. & Son, Inc., West Chester, Pa.

—Fuel Oil
Davison, N. C., Gas Burner & Welding Co., 3145 Penn Ave., Pittsburgh, Pa.
*LOCKETT, A. M. & CO., New Orleans, La. *p. 131*
Rogers-Higgins Co., Inc., 710 Carondelet Bldg., New Orleans, La.

PUMPING POWERS
FAIRBANKS-MORSE & CO., 900 S. Wabash Ave., Chicago, Ill...*p. 41*
*GOULDS MFG. CO., Seneca Falls, N. Y. *pp. 570, 571, 572, 573*
NATIONAL SUPPLY CO., Toledo, Ohio *pp. 648, 649*
Reid, Joseph Gas Engine Co., Oil City, Pa.
*TITUSVILLE IRON WORKS CO., Titusville, Pa...*p. 89*
*WORTHINGTON PUMP & MACHINERY CORP'N, 115 Broadway, New York, N. Y. *pp. 44, 45, 46, 47*

PUMPS

—Acid
American Hard Rubber Co., 11 Mercer St., New York, N. Y.
AMERICAN STEAM PUMP, CO., Battle Creek, Mich...*p. 562*
BEACH-RUSS CO., 50 Church St., New York, N. Y...*p 560*
BLACKMER ROTARY PUMP CO., Petoskey, Mich...*p. 563*
Chemical Pump & Valve Co., 327 Gifford St., Perth Amboy, N. J.
DAYTON-DOWD CO., Quincy, Ill...*p. 566*
Duriron Co. (Inc.), Dayton, Ohio
*GOULDS MFG. CO., Seneca Falls, N. Y. *pp. 570, 571, 572, 573*
McGOWAN, JOHN H. CO., Cincinnati, Ohio *pp. 574, 575*
Nassau Valve & Pump Co. (Inc.), Rockville Center, L. I., N. Y.
*TABER PUMP CO., 291 Elm St., Buffalo, N. Y...*p. 581*
*TITUSVILLE IRON WORKS CO., Titusville, Pa...*p. 89*
*UNION STEAM PUMP CO., Battle Creek, Mich...*p. 582*

—Air
(See Pumps, Vacuum)

—Air Lift
American Air Compressor Works, 26 Cortlandt St., New York, N. Y.
Indiana Air Pump Co., 812 K. of P. Bldg., Indianapolis, **Ind.**
*INGERSOLL-RAND CO., 11 Broadway, New York, N. Y...*pp. 546, 547*
SULLIVAN MACHINERY CO., 120 S. Michigan Ave., Chicago, Ill...*p. 549*
Weber Subterranean Pump Co., 50 E. 42nd St., New York, N. Y.
WESTINGHOUSE TRACTION BRAKE CO., Wilmerding, Pa...*pp. 550, 551*

—Alkali
*TABER PUMP CO., 291 Elm St., Buffalo, N. Y...*p. 581*

—Ammonia
BLACKMER ROTARY PUMP CO., Petoskey, Mich...*p. 563*
DAYTON-DOWD CO., Quincy, Ill...*p. 566*
*DE LAVAL STEAM TURBINE CO., Trenton, N. J...*p. 22*
DEMING CO., Salem, Ohio..*p. 567*
*GOULDS MFG. CO., Seneca Falls, N. Y. *pp. 570, 571, 572, 573*
*VOGT, HENRY MACHINE CO., Louisville, Ky...*pp. 632, 633*
*WORTHINGTON PUMP & MACHINERY CORP'N, 115 Broadway, New York, N. Y. *pp. 44, 45, 46, 47*
YORK MFG. CO., York, Pa...*p. 631*

—Bilge
AMERICAN STEAM PUMP CO., Battle Creek, Mich...*p. 562*
Chicago Pump Co., 2344 Wolfram St., Chicago, Ill.
DAYTON-DOWD CO., Quincy, Ill...*p. 566*
ECONOMY PUMPING MACHINERY CO., 104-118 N. Curtis St., Chicago, Ill...*p. 568*
*GOULDS MFG. CO., Seneca Falls, N. Y. *pp. 570, 571, 572, 573*
McGOWAN, JOHN H. CO., Cincinnati, Ohio *pp. 574, 575*
Quimby, William E., Inc., 209 Parkhurst St., Newark, N. J.

Digitized by Google

PUMPS (Continued)

*TERRY STEAM TURBINE CO., Hartford, Conn...*pp. 26, 27*
WARREN STEAM PUMP CO., Warren, Mass...*p. 583*
YEOMANS BROS. CO., 1426 Dayton St., Chicago, Ill...*p. 584*

—Bilge (Rotary)

BLACKMER ROTARY PUMP CO., Petoskey, Mich...*p. 563*
FAIRBANKS, MORSE & CO., 900 S. Wabash Ave., Chicago, Ill...*p. 41*
NORTHERN FIRE APPARATUS CO., 2422 University Ave., S. E., Minneapolis, Minn. *p. 577*
*TABER PUMP CO., 291 Elm St., Buffalo, N. Y...*p. 581*

—Boiler Feed

Advance Pump & Compressor Co., Battle Creek, Mich.
*ALLIS-CHALMERS MFG. CO., Milwaukee, Wis...*pp. 28, 29*
AMERICAN STEAM PUMP CO., Battle Creek, Mich...*p. 562*
Boyts, Porter & Co., Connellsville, Pa.
Chalmers Pump & Mfg. Co. ("Canton Hughes"), Lima, Ohio
Columbus Steam Pump Works, P. O. Box 394, Columbus, Ohio
COPPUS ENGINEERING & EQUIPMENT CO., 342-348 Park Ave., Worcester, Mass. *pp. 104, 105*
*DAVIDSON, M. T. CO. ("Davidson"), 154 Nassau St., New York, N. Y...*p. 565*
DAYTON-DOWD CO., Quincy, Ill...*p. 566*
Dayton Turbine Pump Co., W. 4th & Cuyahoga Ave., Cleveland, Ohio
*DE LAVAL STEAM TURBINE CO., Trenton, N. J...*p. 22*
DEMING CO., Salem, Ohio..*p. 567*
ECONOMY PUMPING MACHINERY CO., 104-118 No. Curtis St., Chicago, Ill...*p. 568*
FAIRBANKS, MORSE & CO., 900 S. Wabash Ave., Chicago, Ill...*p. 41*
Foster Pump Works, 36 Bridge St., Brooklyn, N. Y.
Gardner Governor Co., Quincy, Ill.
*GOULDS MFG. CO., Seneca Falls, N. Y. *pp. 570, 571, 572, 573*
Hall Steam Pump Co., Pittsburgh, Pa.
*INGERSOLL-RAND CO. (A. S. Cameron Steam Pump Works), 11 Broadway, New York, N. Y...*p. 564*
*KERR TURBINE CO., Wellsville, N. Y. *p. 23*
Locomotive Feed Water Heater Co., 30 Church St., New York, N. Y.
Lucey Mfg. Corp'n, Woolworth Bldg., New York, N. Y.
McGOWAN, JOHN H. CO., Cincinnati, Ohio *pp. 574, 575*
Midwest Engine Co., Indianapolis, Ind.
*MORRIS MACHINE WORKS, Baldwinsville, N. Y...*pp. 578, 579*
Nash Engineering Co. ("Hytor"), South Norwalk, Conn.
National Steam Pump Co., Upper Sandusky, Ohio
Park Mfg. Co., Charlotte, N. C.
PELTON WATER WHEEL CO., 1982 Harrison St., San Francisco, Cal...*pp. 34, 35*
Reilly, J. J. Mfg. Co., 119 N. 10th St., Louisville, Ky.
Rumsey Pump Co. (Ltd.), Seneca Falls, N. Y.
Stewart Heater Co., No. Tonawanda, N. Y.
*SUPERHEATER COMPANY, 17 East 42nd St., New York, N. Y...*p. 98*
*TERRY STEAM TURBINE CO., Hartford, Conn...*pp. 26, 27*
Twinvolute Pump & Mfg. Co., 216-228 High St., Newark, N. J.
*UNION STEAM PUMP CO., Battle Creek, Mich...*p. 582*
Vogt Bros. Mfg. Co., 1428 W. Main St., Louisville, Ky.
Wagener Steam Pump Co., Canton, Ohio
WARREN STEAM PUMP CO., Warren, Mass...*p. 583*
*WHEELER, C. H. MFG. CO., Sedgley & Lehigh Aves., Philadelphia, Pa...*p. 163*
*WHEELER CONDENSER & ENGRG. CO., Carteret, N. J...*p. 162*
*WORTHINGTON PUMP & MACHINERY CORP'N, 115 Broadway, New York, N. Y. *pp. 44, 45, 46, 47*

—Brine

AMERICAN STEAM PUMP CO., Battle Creek, Mich...*p. 562*
BEACH-RUSS CO., 50 Church St., New York, N. Y...*p. 560*
BLACKMER ROTARY PUMP CO., Petoskey, Mich...*p. 563*
*DAVIDSON, M. T. CO. ("Davidson"), 154 Nassau St., New York, N. Y...*p. 565*
DAYTON-DOWD CO., Quincy, Ill...*p. 566*
TABER PUMP CO., 291 Elm St., Buffalo, N. Y...*p. 581*

—Centrifugal

Advance Pump & Compressor Co., Battle Creek, Mich.
Alberger Pump & Condenser Co. ("Alberger"), 140 Cedar St., New York, N. Y.
*ALLIS-CHALMERS MFG. CO., Milwaukee, Wis...*pp. 28, 29*
AMERICAN STEAM PUMP CO., Battle Creek, Mich...*p. 562*
American Well Works, Aurora, Ill.
Aurora Pump Mfg. Co., Aurora, Ill.
Bagley & Sewall Co., Watertown, N. Y.
Buffalo Steam Pump Co., 490 Broadway, Buffalo, N. Y.
Carthage Machine Co., Carthage, N. Y.
Chicago Pump Co., 2344 Wolfram St., Chicago, Ill.
COPPUS ENGINEERING & EQUIPMENT CO., 342-348 Park Ave., Worcester, Mass. *pp. 104, 105*
*CRAMP, WM. & SONS SHIP & ENGINE BLDG. CO. ("High-Speed Spiral"), Richmond & Norris Sts., Philadelphia, Pa...*pp. 30, 31*
DAYTON-DOWD CO., Quincy, Ill...*p. 566*
Dayton Turbine Pump Co., W. 4th & Cuyahoga Ave., Cleveland, Ohio
*DE LAVAL STEAM TURBINE CO., Trenton, N. J...*p. 22*
D'Olier Centrifugal Pump & Machine Co., 400 Morris Bldg., Philadelphia, Pa.
Dominion Engineering Works, Ltd., P. O. Box 2799 Montreal, Quebec, Canada
Dow Pump & Diesel Engine Co., Alameda, Cal.
Earle Gear & Machine Co. ("Earle"), 4709 Stenton Ave., Philadelphia, Pa.
East Iron & Machine Co., Lima, Ohio
ECONOMY PUMPING MACHINERY CO., 104-118 No. Curtis St., Chcago, Ill..*p. 568*
ELLICOTT MACHINE CORPORATION, Baltimore, Md...*p. 588*
Erwin & Co., 3734 Cottage Grove Ave., Chicago, Ill.
FAIRBANKS, MORSE & CO., 900 S. Wabash Ave., Chicago, Ill...*p. 41*
Frederick Iron & Steel Co., Frederick, Md.
Fulton Machine & Vise Co., Lowville, N. Y.
Goldie & McCulloch Co. (Ltd.), Galt., Ont., Canada
*GOULDS MFG. CO., Seneca Falls, N. Y. *pp. 570, 571, 572, 573*
Gray Aldrich Co., Inc., 84 Atlantic Ave., Boston, Mass.
Holland Machine Co., 132 Water St., South Norwalk, Conn.

Digitized by Google

Howden, James & Co. (Ltd.), Wellsville, N. Y.
*INGERSOLL-RAND CO. (A. S. Cameron Steam Pump Works), 11 Broadway, New York, N. Y...*p. 564*
Inglis, John Co. (Ltd.), Toronto, Ont., Canada
Jackson, Byron Iron Works, 401 Sharon Bldg., San Francisco, Cal.
*KERR TURBINE CO., Wellsville, N. Y...*p. 23*
Kingston Foundry & Machine Works, Oswego, N. Y.
*LAMMERT & MANN CO., Wood & Walnut Sts., Chicago, Ill...*p. 561*
La Vergne Pump & Machine Co., 284 N. 5th St., Newark, N. J.
Lawrence, L. & Co., 290 Halsey St., Newark, N. J.
Lawrence Machine Co., Lawrence, Mass.
Lawrence Pump & Engine Co., Lawrence, Mass.
Lea-Courtenay Co., 19 Maine St., New York, N. Y.
MANISTEE IRON WORKS CO. ("Roturbo"), Manistee, Mich...*pp. 158, 576*
*MORRIS MACHINE WORKS, Baldwinsville, N. Y...*pp. 578, 579*
*NOVO ENGINE CO., Lansing, Mich...*pp. 586, 587*
Oliver Mfg. Co., Fourth & Madison Sts., Oakland, Cal.
PELTON WATER WHEEL CO., 1982 Harrison St., San Francisco, Cal...*pp. 34, 35*
Plant Engineering & Equipment Co. (Inc.), 192 Broadway, New York, N. Y.
Price, G. W. Pump & Engine Co., 33 Stevenson St., San Francisco, Cal.
Quimby, William E., Inc., 209 Parkhurst St., Newark, N. J.
Rumsey Pump Co. (Ltd.), Seneca Falls, N. Y.
*SCHUTTE & KOERTING CO., 1184 Thompson St., Philadelphia, Pa...*p. 159*
Scranton Pump Co., Scranton, Pa.
Smith, T. L. Co., 470 Old Colony Bldg., Chicago, Ill.
Sprado Engineering Co., 704 American Bank Bldg., Los Angeles, Cal.
Standard Oil Engine Co., 130 Seaview Ave., Bridgeport, Conn.
Swaby Mfg. Co., 2010 Marshall Blvd., Chicago, Ill.
*TABER PUMP CO., 291 Elm St., Buffalo, N. Y...*p. 581*
Tampa Shipbuilding & Engineering Co., Tampa, Fla.
*TERRY STEAM TURBINE CO., Hartford, Conn...*pp. 26, 27*
Turbine Equipment Co., 50 Church St., New York, N. Y.
Twinvolute Pump & Mfg. Co., 216-228 High St., Newark, N. J.
UNION ENGINEERING CO., Cleveland, Ohio *p. 645*
*UNION STEAM PUMP CO., Battle Creek, Mich...*p. 582*
United Iron Works, Oakland, Cal.
Universal Motor Co., Oshkosh, Wis.
VALLEY IRON WORKS CO., Appleton, Wis...*p. 647*
Weinman Pump Mfg. Co., Columbus, Ohio
*WHEELER CONDENSER & ENGINEERING CO., Carteret, N. J...*p. 162*
*WHEELER, C. H. MFG. CO., Sedgley & Lehigh Aves., Philadelphia, Pa...*p. 163*
Wilson-Snyder Mfg. Co., Pittsburgh, Pa.
*WORTHINGTON PUMP & MACHINERY CORP'N, 115 Broadway, New York, N. Y...*pp. 44, 45, 46, 47*
YEOMANS BROS. CO., 1426 Dayton St., Chicago, Ill...*p. 584*
Young Pump Co., 710 S. Main St., Michigan City, Ind.
Yuba Mfg. Co., Marysville, Cal.

—Chemical
BLACKMER ROTARY PUMP CO. ("Rotary"), Petoskey, Mich...*p. 563*
*GOULDS MFG. CO., Seneca Falls, N. Y. *pp. 570, 571, 572, 573*
*TABER PUMP CO., 291 Elm St., Buffalo, N. Y...*p. 581*
*UNION STEAM PUMP CO., Battle Creek, Mich...*p. 582*

—Condensation (with Automatic Receiver)
AMERICAN STEAM PUMP CO., Battle Creek, Mich...*p. 562*
BEACH-RUSS CO., 50 Church St., New York, N. Y...*p. 560*
*UNION STEAM PUMP CO., Battle Creek, Mich...*p. 582*
*WHEELER CONDENSER & ENGRG. CO., Carteret, N. J...*p. 162*
*WORTHINGTON PUMP & MACHINERY CORP'N, 115 Broadway, New York, N. Y...*pp. 44, 45, 46, 47*
YEOMANS BROS. CO., 1426 Dayton St., Chicago, Ill...*p. 584*
Chalmers Pump & Mfg. Co. ("Canton Hughes"), Lima, Ohio
Chicago Pump Co., 2344 Wolfram St., Chicago, Ill.
ECONOMY PUMPING MACHINERY CO., 104-118 No. Curtis St., Chicago, Ill...*p. 563*
Farnsworth Co. ("Simplex"), Conshohocken, Pa.
*GOULDS MFG. CO., Seneca Falls, N. Y. *pp. 570, 571, 572, 573*
Thompson Mfg. Co., Des Moines, Iowa

—Deep Well
AMERICAN STEAM PUMP CO., Battle Creek, Mich...*p. 562*
American Well Works, Aurora, Ill.
Bradford Motor Works, Bradford, Pa.
Chippewa Pump Co. ("Chippewa"), Chippewa Falls, Wis.
Columbus Steam Pump Works, P. O. Box 394, Columbus, Ohio
COOK, A. D. (Inc.), Lawrenceburg, Ind. *p. 585*
*DAVIDSON, M. T. Co. ("Davidson"), 154 Nassau St., New York, N. Y...*p. 565*
DEMING CO., Salem, Ohio...*p. 567*
FAIRBANKS, MORSE & CO., 900 S. Wabash Ave., Chicago, Ill...*p. 41*
Fort Wayne Engineering & Mfg. Co. ("Paul"), Fort Wayne, Ind.
Foster Pump Works, 36 Bridge St., Brooklyn, N. Y.
*GOULDS MFG. CO., Seneca Falls, N. Y. *pp. 570, 571, 572, 573*
Humphreys Mfg. Co., Mansfield, Ohio
*INGERSOLL-RAND CO. (A. S. Cameron Steam Pump Works), 11 Broadway, New York, N. Y...*p. 564*
Jackson, Byron Iron Works, 401 Sharon Bldg., San Francisco, Cal.
Keystone Driller Co., Beaver Falls, Pa.
LUITWIELER PUMPING ENGINE CO., Rochester, N. Y...*p. 569*
*NOVO ENGINE CO., Lansing, Mich...*pp. 586, 587*
Nye Steam Pump & Machinery Co., 701 N. Western Ave., Chicago, Ill.
Rumsey Pump Co., (Ltd.), Seneca Falls, N. Y.
*UNION STEAM PUMP CO., Battle Creek, Mich...*p. 582*
United Iron Works, Inc., 301 Ridge Arcade Bldg., Kansas City, Mo.
WARREN STEAM PUMP CO., Warren, Mass...*p. 583*
Weber Subterranean Pump Co., 50 E. 42nd St., New York, N. Y.

Pu

Digitized by Google

PUMPS (Continued)

Weinman Pump Mfg. Co., Columbus, Ohio
*WORTHINGTON PUMP & MACHINERY CORP'N, 115 Broadway. New York, N. Y. *pp. 44, 45, 46, 47*

—Diaphragm
DEMING CO., Salem, Ohio. *p. 567*
Domestic Engine & Pump Co., Shippenburg, Pa.
Edson Mfg. Co., 377 Broadway, Boston, Mass.
FAIRBANKS, MORSE & CO., 900 S. Wabash Ave., Chicago, Ill. *p. 41*
*GOULDS MFG. CO., Seneca Falls, N. Y. *pp. 570, 571, 572, 573*
*NOVO ENGINE CO., Lansing, Mich. *pp. 586, 587*

—Dredging
ELLICOTT MACHINE CORP'N, Baltimore, Md. *p. 588*
FAIRBANKS, MORSE & CO., 900 S. Wabash Ave., Chicago, Ill. *p. 41*
*GOULDS MFG. CO., Seneca Falls, N. Y. *pp. 570, 571, 572, 573*
*KERR TURBINE CO., Wellsville, N. Y. *p. 23*
*MORRIS MACHINE WORKS, Baldwinsville, N. Y. *pp. 578, 579*
*TERRY STEAM TURBINE CO., Hartford, Conn. *pp. 26, 27*
*WORTHINGTON PUMP & MACHINERY CORP'N, 115 Broadway, New York, N. Y. *pp. 44, 45, 46, 47*

—Dry Vacuum
(See Pumps, Vacuum)

—Electric
*ALLIS-CHALMER MFG. CO., Milwaukee, Wis. *pp. 28, 29*
AMERICAN STEAM PUMP CO., Battle Creek, Mich. *p. 562*
BLACKMER ROTARY PUMP CO., Petoskey, Mich. *p. 563*
Chalmers Pump & Mfg. Co. ("Canton Hughes"), Lima, Ohio
Chicago Pump Co., 2844 Wolfram St., Chicago, Ill.
DAYTON-DOWD CO., Quincy, Ill. *p. 566*
*DE LAVAL STEAM TURBINE CO., Trenton, N. J. *p. 22*
DEMING CO., Salem, Ohio. *p. 567*
ECONOMY PUMPING MACHINERY CO., 104-118 No. Curtis St., Chicago, Ill. *p. 568*
Erwin & Co., 3784 Cottage Grove Ave., Chicago, Ill.
FAIRBANKS, MORSE & CO., 900 S. Wabash Ave., Chicago, Ill. *p. 41*
Foster Pump Works, 86 Bridge St., Brooklyn, N. Y.
*GOULDS MFG. CO., Seneca, N. Y. *pp. 570, 571, 572, 573*
*INGERSOLL-RAND CO. (A. S. Cameron Steam Pump Works), 11 Broadway, New York, N. Y. *p. 564*
Ives Mfg. Co., Baltimore, Md.
Janette Mfg. Co., 556 W. Monroe St., Chicago, Ill.
*LAMMERT & MANN CO., Wood & Walnut Sts., Chicago, Ill. *p. 561*
Lawrence Machine Co., Lawrence, Mass.
Lawrence Pump & Engine Co., Lawrence, Mass.
LUITWIELER PUMPING ENGINE CO., Rochester, N. Y. *p. 569*
McGOWAN, JOHN H. CO., Cincinnati, Ohio *pp. 574, 575*
*MORRIS MACHINE WORKS, Baldwinsville, N. Y. *pp. 578, 579*
Peters Pump Co., Kewanee, Ill.
Plant Engineering & Equipment Co. (Inc.), 192 Broadway, New York, N. Y.
Pneumelectric Corporation, 219 Wyoming St., Syracuse, N. Y.
PRESCOTT CO., Menominee, Mich. *p. 580*
Provost Engineering Corp'n, 50 Church St., Brooklyn, N. Y.
Quimby, William E., Inc., 209 Parkhurst St., Newark, N. J.
Roberts, Geo. J. Co., 235-251 E. 2nd St., Dayton, Ohio
Rumsey Pump Co. (Ltd.), Seneca Falls, N. Y.
Scranton Pump Co., Scranton, Pa.
Standard Pump & Engine Co., Akron, Ohio
Swaby Mfg. Co., 2010 Marshall Blvd., Chicago, Ill.
*TABER PUMP CO., 291 Elm St., Buffalo, N. Y. *p. 581*
*UNION STEAM PUMP CO., Battle Creek, Mich. *p. 582*
*WORTHINGTON PUMP & MACHINERY CORPN., 115 Broadway, New York, N. Y. *pp. 44, 45, 46, 47*

—Elevator
AMERICAN STEAM PUMP CO., Battle Creek, Mich. *p. 562*
*DAVIDSON, M. T. CO. ("Davidson"), 154 Nassau St., New York, N. Y. *p. 565*
DAYTON-DOWD CO., Quincy, Ill. *p. 566*
*DE LAVAL STEAM TURBINE CO., Trenton, N. J. *p. 22*
DEMING CO., Salem, Ohio. *p. 567*
*GOULDS MFG. CO., Seneca Falls, N. Y. *pp. 570, 571, 572, 573*
*INGERSOLL-RAND CO. (A. S. Cameron Steam Pump Works), 11 Broadway, New York, N. Y. *p. 564*
*KERR TURBINE CO., Wellsville, N. Y. *p. 23*
McGOWAN, JOHN H., CO., Cincinnati, Ohio *pp. 574, 575*
Twinvolute Pump & Mfg. Co., 216-228 High St., Newark, N. J.
*UNION STEAM PUMP CO., Battle Creek, Mich. *p. 582*
WARREN STEAM PUMP CO., Warren, Mass. *p. 583*
*WORTHINGTON PUMP & MACHINERY CORP'N, 115 Broadway, New York, N. Y. *pp. 44, 45, 46, 47*

—Filter Press
AMERICAN STEAM PUMP CO., Battle Creek, Mich. *p. 562*
BEACH-RUSS CO., 50 Church St., New York, N. Y. *p. 560*
*DAVIDSON, M. T. CO. ("Davidson"), 154 Nassau St., New York, N. Y. *p. 565*
HYDRAULIC PRESS MFG. CO., Mount Gilead, Ohio. *p. 593*
Latta-Martin Pump Co., Hickory, N. C.

—Fire
*ALLIS-CHALMERS MFG. CO., Milwaukee, Wis. *pp. 28, 29*
DAYTON-DOWD CO., Quincy, Ill. *p. 566*
*DE LAVAL STEAM TURBINE CO., Trenton, N. J. *p. 22*
DEMING CO., Salem, Ohio. *p. 567*
FAIRBANKS, MORSE & CO., 900 S. Wabash Ave., Chicago, Ill. *p. 41*
*GOULDS MFG. CO., Seneca Falls, N. Y. *pp. 570, 571, 572, 573*
*INGERSOLL-RAND CO. (A. S. Cameron Steam Pump Works), 11 Broadway, New York, N. Y. *p. 564*
Lucas-Miner Pumps Co., Springfield, Ohio
*MORRIS MACHINE WORKS, Baldwinsville, N. Y. *pp. 578, 579*
NORTHERN FIRE APPARATUS CO., 2422 University Ave., S. E., Minneapolis, Minn. *p. 577*
*TERRY STEAM TURBINE CO., Hartford, Conn. *pp. 26, 27*
*UNION STEAM PUMP CO., Battle Creek, Mich. *p. 582*
WARREN STEAM PUMP CO., Warren, Mass. *p. 583*

Digitized by Google

—Gas
Hydraulic Gas Power Co., Foot of Phelps St., Youngstown, Ohio

—Gas Power
*GOULDS MFG. CO., Seneca, N. Y. *pp. 570, 571, 572, 573*
NATIONAL SUPPLY CO., Toledo, Ohio... *pp. 648, 649*
Hydraulic Gas Power Co., Foot So. Phelps St., Youngstown, Ohio
*NOVO ENGINE CO., Lansing, Mich...*pp. 586, 587*

—Gasoline
BLACKMER ROTARY PUMP CO., Petoskey, Mich...*p. 563*
*GOULDS MFG. CO., Seneca Falls, N. Y. *pp. 570, 571, 572, 573*
Kupferle Bros. Mfg. Co., 600 N. 2nd St., St. Louis, Mo.
*TABER PUMP CO., 291 Elm St., Buffalo, N. Y...*p. 581*
Waldo Bros. & Bond Co., 181 Congress St., Boston, Mass.

—Hand
BURROUGHS, CHARLES CO. (The), Newark, N. J...*p. 590*
DEMING CO., Salem, Ohio..*p. 567*
Douglas, W. & B., Middletown, Conn.
*GOULDS MFG. CO., Seneca Falls, N. Y. *pp. 570, 571, 572, 573*
Hazen Mfg. Co., Hudson, Mich.
Humphreys Mfg. Co., Mansfield, Ohio
Myers, F. E. & Bro., Ashland, Ohio

—Hydraulic Pressure
Aldrich Pump Co., Allentown, Pa.
AMERICAN STEAM PUMP CO., Battle Creek, Mich...*p. 562*
Blake Pump & Condenser Co., Fitchburg, Mass.
Boyts, Porter & Co., Connellsville, Pa.
BUCKEYE IRON & BRASS WORKS, Dayton, Ohio..*p. 168*
BURROUGHS, CHARLES CO. (The), Newark, N. J...*p. 590*
DAYTON-DOWD CO., Quincy, Ill...*p. 566*
*DE LAVAL STEAM TURBINE CO., Trenton, N. J...*p. 22*
DEMING CO., Salem, Ohio *p. 567*
Dudgeon, Richard, Broome & Columbia Sts., New York, N. Y.
Dunning & Boschert Press Co. (Inc.), 329 W. Water St., Syracuse, N. Y.
ELMES, CHAS. F. ENGINEERING WORKS, 215 N. Morgan St., Chicago, Ill...*p. 591*
FAIRBANKS, MORSE & CO., 900 S. Wabash Ave., Chicago, Ill...*p. 41*
GALLAND-HENNING MFG. CO., Milwaukee, Wis. *p. 592*
*GOULDS MFG. CO., Seneca Falls, N. Y. *pp. 570, 571, 572, 573*
HUDRAULIC PRESS MFG. CO., (The), Mount Gilead, Ohio..*p. 593*
Logemann Bros. Co., 3120 Burleigh St., Milwaukee, Wis.
McGOWAN, JOHN H. CO., Cincinnati, Ohio *pp. 574, 575*
METALWOOD MFG. CO., Detroit, Mich. *p. 594*
*MORRIS MACHINE WORKS, Baldwinsville, N. Y...*pp. 578, 579*
OILGEAR COMPANY, 60-62-64 27th St., Milwaukee, Wis...*p. 483*
OLSEN, TINIUS TESTING MACHINE CO., 500 N. 12th St., Philadelphia, Pa...*pp. 265, 266, 267*
ROBERTSON, JOHN & CO., 133 Water St., Brooklyn, N. Y...*p. 595*
Rumsey Pump Co. (Ltd.), Seneca Falls, N. Y.
*UNION STEAM PUMP CO., Battle Creek, Mich...*p. 582*
WARREN STEAM PUMP CO., Warren, Mass...*p. 583*
WATSON-STILLMAN CO., 35 Church St., New York, N. Y...*p. 596*
Wilson-Snyder Mfg. Co., Pittsburgh, Pa.
*WORTHINGTON PUMP & MACHINERY CORP'N, 115 Broadway, New York, N. Y. *pp. 44, 45, 46, 47*

—Irrigation
*ALLIS-CHALMERS MFG. CO., Milwaukee, Wis...*pp. 28, 29*
DAYTON-DOWD CO., Quincy, Ill...*p. 566*
FAIRBANKS, MORSE & CO., 900 S. Wabash Ave., Chicago, Ill...*p. 41*
*GOULDS MFG. CO., Seneca Falls, N. Y. *pp. 570, 571, 572, 573*
*UNION STEAM PUMP CO., Battle Creek, Mich...*p. 582*
Viking Pump Co., Cedar Falls, Iowa
*WHEELER CONDENSER & ENGINEERING CO., Carteret, N. J...*p. 162*

—Jet
Blakeslee Mfg. Co., Du Quoin, Ill.

—Lift and Force
Chippewa Pump Co. ("Chippewa"), Chippewa Falls, Wis.
DEMING CO., Salem, Ohio...*p. 567*
FAIRBANKS, MORSE & CO., 900 S. Wabash Ave., Chicago, Ill...*p. 41*
*GOULDS MFG. CO., Seneca Falls, N. Y. *pp. 570, 571, 572, 573*
Hazen Mfg. Co., Hudson, Mich.
LUITWIELER PUMPING ENGINE CO., Rochester, N. Y...*p. 569*
Mast, Foos & Co. ("Buckeye"), Springfield, Ohio
*NOVO ENGINE CO., Lansing, Mich...*pp. 586, 587*
Ottumwa-Moline Engine & Pump Co., Ottumwa, Iowa
Rife Hydraulic Engine Mfg. Co., 90 West St., New York, N. Y.

—Measuring (Gasoline or Oil)
American Oil Pump & Tank Co., Findlay & Dalton Sts., Cincinnati, Ohio
Dayton Pump & Mfg. Co., 5th & Northwood Sts., Dayton, Ohio
*RICHARDSON-PHENIX CO., 126 Reservoir Ave., Milwaukee, Wis...*pp. 248, 249*
Wayne Oil Tank & Pump Co., 749 Canal St., Fort Wayne, Ind.

—Milk
AMERICAN STEAM PUMP CO., Battle Creek, Mich...*p. 562*
BLACKMER ROTARY PUMP CO., Petoskey, Mich...*p. 563*
*DAVIDSON, M. T. CO., 154 Nassau St., New York, N. Y...*p. 565*
DAYTON-DOWD CO., Quincy, Ill...*p. 566*
ELMES, CHAS. F. ENGINEERING WORKS, 215 N. Morgan St., Chicago, Ill...*p. 591*
Lobee Pump & Machinery Co., 111 Dearborn St., Buffalo, N. Y.
*TABER PUMP CO., 291 Elm St., Buffalo, N. Y...*p. 581*
*UNION STEAM PUMP CO., Battle Creek, Mich...*p. 582*

—Mine
*ALLIS-CHALMERS MFG. CO., Milwaukee, Wis...*pp. 28, 29*
AMERICAN STEAM PUMP CO., Battle Creek, Mich...*p. 562*
Blakeslee Mfg. Co., Du Quoin, Ill.
Crawford & McCrimmon Co., Brazil, Ind.
DAYTON-DOWD CO., Quincy, Ill...*p. 566*
*DE LAVAL STEAM TURBINE CO., Trenton, N. J...*p. 22*
DEMING CO. Salem Ohio..*p. 567*
FAIRBANKS, MORSE & CO., 900 S. Wabash Ave., Chicago, Ill...*p. 41*
Fairmont Mining Machinery Co., Fairmont, W. Va.
*GOULDS MFG. CO., Seneca Falls, N. Y. *pp. 570, 571, 572, 573*

Pu

Digitized by Google

PUMPS (Continued)

*INGERSOLL-RAND CO. (A. S. Cameron Steam Pump Works), 11 Broadway, New York, N. Y...*p. 564*

*KERR TURBINE CO., Wellsville, N. Y. ..*p. 23*

LUITWIELER PUMPING ENGINE CO., Rochester, N. Y...*p. 569*

McGOWAN, JOHN H. CO., Cincinnati, Ohio *pp. 574, 575*

*MORRIS MACHINE WORKS, Baldwinsville, N. Y...*pp. 578, 579*

Murray Pump & Valve Mfg. Co., New Lexington, Ohio

National Steam Pump Co., Upper Sandusky, Ohio

PRESCOTT CO., Menominee, Mich. *p. 580*

Swaby Mfg. Co., 2010 Marshall Blvd., Chicago, Ill.

*UNION STEAM PUMP CO., Battle Creek, Mich...*p. 582*

WARREN STEAM PUMP CO, Warren, Mass...*p. 583*

Weinman Pump Mfg. Co., Columbus, Ohio

—Oil

Advance Pump & Compressor Co., Battle Creek, Mich.

AMERICAN STEAM PUMP CO., Battle Creek, Mich...*p. 562*

Axelson Machine Co., P. O. Box 316, Los Angeles, Cal.

BEACH-RUSS CO., 50 Church St., New York, N. Y...*p. 560*

*BEST, W. N. FURNACE & BURNER CORP'N, 11 Broadway, New York, N. Y. *pp. 130, 531*

BLACKMER ROTARY PUMP CO. ("Rotary"), Petoskey, Mich...*p. 563*

Bowser, S. F. & Co. (Inc.), Ft. Wayne, Ind.

Connersville Blower Co., Connersville, Ind.

DAYTON-DOWD CO., Quincy, Ill...*p. 566*

DEMING CO., Salem, Ohio..*p. 567*

FAIRBANKS, MORSE & CO., 900 S. Wabash Ave., Chicago, Ill...*p. 41*

Fulflo Pump Co., Blanchester, Ohio

*GOULDS MFG. CO., Seneca Falls, N. Y. *pp. 570, 571, 572, 573*

*INGERSOLL-RAND CO. (A. S. Cameron Steam Pump Works), 11 Broadway, New York, N. Y...*p. 564*

Kinney Mfg. Co., Jamaica Plain, Boston, Mass.

Leader-Trahern Products Co., Rockford, Ill.

Lobee Pump & Machinery Co., 111 Dearborn St., Buffalo, N. Y.

*LUNKENHEIMER CO. ("Invincible", "Marvel"), Cincinnati, Ohio..*pp. 184, 185, 186, 187, 188, 189*

McGOWAN, JOHN H. CO., Cincinnati, Ohio *pp. 574, 575*

McDonald, A. Y. Mfg. Co., Dubuque, Iowa

Manzel Bros. Co. ("Manzel"), 315 Babcock St., Buffalo, N. Y.

*MAXON FURNACE & ENGRG. CO., Muncie, Ind. *pp. 532, 533*

*MORRIS MACHINE WORKS, Baldwinsville, N. Y...*pp. 578, 579*

NATIONAL SUPPLY CO., Toledo, Ohio *pp. 648, 649*

*NOVO ENGINE CO., Lansing, Mich. *pp. 586, 587*

Quimby, William E., Inc., 209 Parkhurst St., Newark, N. J.

*RICHARDSON-PHENIX CO., 126 Reservoir Ave., Milwaukee, Wis...*pp. 248, 249*

*TABER PUMP CO., 291 Elm St., Buffalo, N. Y...*p. 581*

*UNION STEAM PUMP CO., Battle Creek, Mich...*p. 582*

Viking Pump Co., Cedar Falls, Iowa

WARREN STEAM PUMP CO., Warren, Mass...*p. 583*

*WORTHINGTON PUMP & MACHINERY CORP'N, 115 Broadway, New York, N. Y. *pp. 44, 45, 46, 47*

—Oil (Force Feed)

*GREENE, TWEED & CO. ("Rochester Automatic"), 109 Duane St., New York, N. Y...*p. 250*

Inter-State Machine Products Co., Rochester, N. Y.

*LUNKENHEIMER CO. ("Alpha, "Universal"), Cincinnati, Ohio..*pp. 184, 185, 186, 187, 188, 189*

McCullough Mfg. Co., 2632-2634 Central Ave., Minneapolis, Minn.

Madison-Kipp Corp'n, Madison, Wis.

OILGEAR COMPANY, 60-62-64 27th St., Milwaukee, Wis...*p. 483*

PICKERING GOVERNOR CO., Portland, Conn...*p. 247*

Sherwood Mfg. Co., 1702-1712 Elmwood Ave., Buffalo, N. Y.

—Oil (Hand)

LONERGAN, J. E. CO., 211-215 Race St., Philadelphia, Pa...*pp. 203, 289*

*RICHARDSON-PHENIX CO., 126 Reservoir St., Milwaukee, Wis...*pp. 248, 249*

Sherwood Mfg. Co., 1702-1712 Elmwood Ave., Buffalo, N. Y.

—Oil (Variable Delivery)

OILGEAR COMPANY, 60-62-64 27th St., Milwaukee, Wis...*p. 483*

—Pneumatic Pressure

DEMING CO., Salem, Ohio..*p. 567*

Fort Wayne Engineering & Mfg. Co., Fort Wayne, Ind.

*GOULDS MFG. CO., Seneca Falls, N. Y. *pp. 570, 571, 572, 573*

Latta-Martin Pump Co., Hickory, N. C.

LUITWIELER PUMPING ENGINE CO., Rochester, N. Y...*p. 569*

McDonald, A. Y. Mfg. Co., Dubuque, Iowa

Mast, Foos & Co. ("Buckeye"), Springfield, Ohio

—Power

Adkins, Young & Allen Co., 561 W. Washington Blvd., Chicago, Ill.

Advance Pump & Compressor Co., Battle Creek, Mich.

*ALLIS-CHALMERS MFG. CO., Milwaukee, Wis...*pp. 28, 29*

AMERICAN STEAM PUMP CO., Battle Creek, Mich...*p. 562*

Buffalo Steam Pump Co., 490 Broadway, Buffalo, N. Y.

Columbus Steam Pump Works, P. O. Box 394, Columbus, Ohio

Dayton Pump & Mfg. Co., 5th & Northwood Sts., Dayton, Ohio

Dean Bros. Steam Pump Works, Indianapolis, Ind.

DEMING CO., Salem, Ohio..*p. 567*

Domestic Engine & Pump Co., Shippenburg, Pa.

Douglas, W. & B., Middletown, Conn.

ECONOMY PUMPING MACHINERY CO., 104-118 No. Curtis St., Chicago, Ill...*p. 568*

Erwin & Co., 3734 Cottage Grove Ave., Chicago, Ill.

FAIRBANKS, MORSE & CO., 900 S. Wabash Ave., Chicago, Ill...*p. 41*

GALLAND-HENNING MFG. CO., Milwaukee, Wis...*p. 592*

*GOULDS MFG. CO., Seneca Falls, N. Y. *pp. 570, 571, 572, 573*

Guild & Garrison, 463 Kent Ave., Brooklyn, N. Y.

Humphryes Mfg. Co., Mansfield, Ohio

*INGERSOLL-RAND CO. (A. S. Cameron Steam Pump Works), 11 Broadway, New York, N. Y...*p. 564*

Kinney Mfg. Co., Jamaica Plain, Boston, Mass.

Digitized by Google

*LAMMERT & MANN CO., Wood & Walnut Sts., Chicago, Ill...*p. 561*
Leader-Trahern Products Co., Rockford, Ill.
Lucas-Miner Pumps Co., Springfield, Ohio
LUITWIELER PUMPING ENGINE CO., Rochester, N. Y...*p. 569*
Lunt-Moss Co., 48 S. Market St., Boston, Mass.
McDonald, A. Y. Mfg. Co., Dubuque, Iowa
McGOWAN, JOHN H. CO., Cincinnati, Ohio *pp. 574, 575*
Mast, Foos & Co. (''Buckeye''), Springfield, Ohio
Matson Machine Co., Concord, N. H.
*MORRIS MACHINE WORKS, Baldwinsville, N. Y...*pp. 578, 579*
National Transit Pump & Machine Co., 19 North Petroleum St., Oil City, Pa.
*NOVO ENGINE CO., Lansing, Mich...*pp. 586, 587*
Peters Pump Co., Kewanee, Ill.
SANDUSKY FOUNDRY & MACHINE CO., Sandusky, Ohio..*p. 646*
Steam Motors Co. (Inc.), Springfield, Mass.
Steiner, M. & Co., 242 Torrence St.. Dayton, Ohio
Stewart Heater Co., No. Tonawanda, N. Y.
Stine, J. C. Co., Tyrone, Pa.
*UNION STEAM PUMP CO., Battle Creek, Mich...*p. 582*
Viking Pump Co., Cedar Falls, Iowa
WARREN STEAM PUMP CO., Warren, Mass...*p. 583*
*WHEELER CONDENSER & ENGINEERING CO., Carteret, N. J...*p. 163*
*WORTHINGTON PUMP & MACHINERY CORP'N, 115 Broadway, New York, N. Y. *pp. 44, 45, 46, 47*
Young Pump Co., 710 S. Main St., Michigan City, Ind.

—Pulsometer

Pulsometer Steam Pump Co., 220 West 42nd St., New York, N. Y.

—Rotary

Clothel Refrigerating Co., 61 Broadway, New York, N. Y.
Connersville Blower Co., Connersville, Ind.
DEMING CO., Salem, Ohio...*p. 567*
FAIRBANKS, MORSE & CO., 900 S. Wabash Ave., Chicago, Ill...*p. 41*
Foster Pump Works, 36 Bridge St., Brooklyn, N. Y.
*GOULDS MFG. CO., Seneca Falls, N. Y... *pp 570, 571, 572, 573*
Kinney Mfg. Co., 3529 Washington St., Boston, Mass.
*LAMMERT & MANN CO., Wood & Walnut Sts., Chicago, Ill...*p. 561*
Leader-Trahern Products Co., Rockford, Ill.
Leiman Bros., 81 Walker St., New York, N. Y.
Lobee Pump & Machinery Co., 111 Dearborn St., Buffalo, N. Y.
Lombard Governor Co., Ashland, Mass.
MANISTEE IRON WORKS (''Roturbo''), Manistee, Mich...*pp. 158, 576*
NORTHERN FIRE APPARATUS CO., 2422 University Ave., S. E., Minneapolis, Minn ..p. 577
*NOVO ENGINE CO., Lansing, Mich..*p. 577*
OILGEAR COMPANY, 60-62-64 27th St., Milwaukee, Wis...*p. 483*
Pittsburgh Machine Tool Co., Braddock, Pa.
Roots, P. H. & F. M. Co., Connersville, Ind.
Rumsey Pump Co. (Ltd.), Seneca Falls, N. Y
SANDUSKY FOUNDRY & MACHINE CO., Sandusky, Ohio...*p. 646*
*TABER PUMP CO., 291 Elm St., Buffalo, N. Y...*p. 581*
*UNION STEAM PUMP CO., Battle Creek Mich...*p. 582*
Viking Pump Co., Cedar Falls, Iowa
Western Pump Co., Moline, Ill.

—Sand

*ALLIS-CHALMERS MFG. CO., Milwaukee, Wis...*pp. 28, 29*
Nye Steam Pump & Machinery Co., 701 N. Western Ave., Chicago, Ill.

—Screw

Quimby, William E. (Inc.), 209 Parkhurst St., Newark, N. J.

—Seepage

DAYTON-DOWD CO., Quincy, Ill...*p. 566*
FAIRBANKS, MORSE & CO., 900 S. Wabash Ave., Chicago, Ill...*p. 41*
*GOULDS MFG. CO., Seneca Falls, N. Y... *pp. 570, 571, 572, 573*

—Sewage

AMERICAN STEAM PUMP CO., Battle Creek, Mich...*p. 562*
Chicago Pump Co., 2344 Wolfram St., Chicago, Ill.
DAYTON-DOWD CO., Quincy, Ill...*p. 566*
DE LAVAL STEAM TURBINE CO., Trenton, N. J...*p. 22*
DEMING CO., Salem, Ohio...*p. 567*
ECONOMY PUMPING MACHINERY CO., 104-118 No. Curtis St., Chicago, Ill...*p. 56*
ELLIOTT MACHINE CORPORATION, Baltimore, Md...*p. 588*
*GOULDS MFG. CO., Seneca Falls, N. Y... *pp. 570, 571, 572, 573*
Kingsford Foundry & Machine Works, Oswego, N. Y.
Lawrence Pump & Engine Co., Lawrence, Mass.
McGOWAN, JOHN H. CO., Cincinnati, Ohio ..*pp. 574, 575*
*MORRIS MACHINE WORKS, Baldwinsville, N Y...*pp. 578, 579*
Nye Steam Pump & Machinery Co., 701 N. Western Ave., Chicago, Ill.
Quimby, William E. (Inc.), 209 Parkhurst St., Newark, N. J.
Twinvolute Pump & Mfg. Co., 216-228 High St., Newark, N. J.
*UNION STEAM PUMP CO., Battle Creek, Mich...*p. 582*
YEOMAN BROS. CO., 1426 Dayton St., Chicago, Ill...*p. 584*

—Size

PERKINS, B. F. & SON (Inc.), Holyoke, Mass...*p. 558*

—Slurry

*SMIDTH, F. L. & CO., 50 Church St., New York, N. Y...*p. 604*

—Soap

AMERICAN STEAM PUMP CO., Battle Creek, Mich...*p. 562*
BEACH-RUSS CO., 50 Church St., New York, N. Y...*p. 560*
DAYTON-DOWD CO., Quincy, Ill...*p. 566*
*GOULDS MFG. CO., Seneca Falls, N. Y... *pp. 570, 571, 572, 573*

—Soap (Rotary)

BLACKMER ROTARY PUMP CO., Petoskey, Mich...*p. 563*
DEMING CO., Salem, Ohio..*p. 567*
*GOULDS MFG. CO., Seneca Falls, N. Y. ..*pp. 570, 571, 572, 573*
Lobee Pump & Machinery Co., 111 Dearborn St., Buffalo, N. Y.
*TABER PUMP CO., 291 Elm St., Buffalo, N. Y...*p. 581*
*UNION STEAM PUMP CO., Battle Creek, Mich...*p. 582*

—Spray

DEMING CO., Salem, Ohio..*p. 567*
*GOULDS MFG. CO., Seneca Falls, N. Y. ..*pp. 570, 571, 572, 573*

Digitized by Google

PUMPS (Continued)

—Steam

Adkins, Young & Allen Co., 561 W. Washington Blvd., Chicago, Ill.
Advance Pump & Compressor Co., Battle Creek, Mich.
*ALLIS-CHALMERS MFG. CO., Milwaukee, Wis...*pp. 28, 29*
AMERICAN STEAM PUMP CO., Battle Creek, Mich...*p. 562*
Blake Pump & Condenser Co., Fitchburg, Pa.
Blakeslee Mfg. Co., Du Quoin, Ill.
*BRAUN, C. F. & CO., San Francisco, Cal. ..*pp. 156, 157*
Buffalo Steam Pump Co., 490 Broadway, Buffalo, N. Y.
Chalmers Pump & Mfg. Co. ("Canton-Hughes"), Lima, Ohio
*DAVIDSON, M. T. CO. ("Davidson") 154 Nassau St., New York, N. Y...*p. 565*
Dean Bros. Steam Pump Works, Indianapolis, Ind.
DuBois Iron Works, 805 Brady St., DuBois, Pa.
Emerson Pump & Valve Co. (Inc.), Alexandria, Va.
FAIRBANKS, MORSE & CO., 900 S. Wabash Ave., Chicago, Ill...*p. 41*
Furness Bros. Co. ("Chicago Knowles"), 1615 W. Walnut St., Chicago, Ill.
Godfrey, Keeler & Co., 70 Warren St.. New York, N. Y.
Guild & Garrison, 463 Kent Ave.. Brooklyn, N. Y.
*INGERSOLL-RAND CO. (A. S. Cameron Steam Pump Works), 11 Broadway, New York, N. Y...*p. 564*
Jamieson, M. W., 1309 Fourth Ave., Warren, Pa.
McGOWAN, JOHN H. CO., Cincinnati, Ohio ..*pp. 574, 575*
Moffatt Machinery Mfg. Co., Charlotte, N. C.
*MORRIS MACHINE WORKS, Baldwinsville, N. Y...*pp. 578, 579*
NATIONAL SUPPLY CO., Toledo, Ohio.. *pp. 648, 649*
National Transit Pump & Machine Co., 19 North Petroleum St., Oil City, Pa.
Oscillating Washer Co., Titusville, Pa.
Pulsometer Steam Pump Co., 220 W. 42nd St., New York, N. Y.
Reilly, J. J. Mfg Co., 119 N. 10th St.. Louisville, Ky.
Scranton Pump Co., Scranton, Pa.
Sprado Engineering Co., 704 American Bank Bldg., Los Angeles, Cal.
*UNION STEAM PUMP CO., Battle Creek, Mich...*pp. 582*
Vogt Bros. Mfg. Co. 1428 W. Main St., Louisville, Ky.
Wagener Steam Pump Co., Canton, Ohio
Walker Mfg. Co., Fenton, Mich.
WARREN STEAM PUMP CO., Warren, Mass. ..*p. 583*
Wells. F. S. Steam Pump Works, 101 S. Clinton St., Chicago, Ill.
*WHEELER CONDENSER & ENGINEERING CO., Carteret, N. J...*p. 162*
*WHEELER, C. H. MFG. CO., Sedgley & Lehigh Aves.. Philadelphia, Pa...*p. 163*
Wilson-Snyder Mfg. Co., Pittsburgh, Pa.
*WORTHINGTON PUMP & MACHINERY CORPN., 115 Broadway, New York, N. Y. ..*pp. 44, 45, 46, 47*

—Stuff

AMERICAN STEAM PUMP CO., Battle Creek, Mich...*p. 562*
BEACH-RUSS CO., 50 Church St., New York, N. Y...*p. 560*
BLACKMER ROTARY PUMP CO., Petoskey, Mich...*p. 563*
Dominion Engineering Works, (Ltd.), P. O. Box 2799, Montreal, Quebec, Canada
*GOULDS MFG. CO., Seneca Falls, N. Y. ..*pp. 570, 571, 572, 573*
*JOLLY, J. & W. (Inc.), Holyoke, Mass... *p. 32*

—Sugar House

AMERICAN STEAM PUMP CO., Battle Creek, Mich...*p. 562*
BLACKMER ROTARY PUMP CO., Petoskey, Mich...*p. 563*
Connersville Blower Co., Connersville, Ind.
DAYTON-DOWD CO., Quincy Ill...*p. 566*
DEMING CO., Salem, Ohio..*p. 567*
FAIRBANKS, MORSE & CO., 900 S. Wabash Ave., Chicago, Ill...*p. 41*
*GOULDS MFG. CO., Seneca Falls, N. Y. ..*pp. 570, 571, 572, 573*
*INGERSOLL-RAND CO. (A. S. Cameron Steam Pump Works), 11 Broadway, New York, N. Y...*p. 564*
McGOWAN, JOHN H. CO., Cincinnati, Ohio ..*pp. 574, 575*
*MORRIS MACHINE WORKS, Baldwinsville, N. Y...*pp. 578, 579*
*UNION STEAM PUMP CO., Battle Creek, Mich...*p. 582*
WARREN STEAM PUMP CO., Warren, Mass. ..*p. 583*
*WORTHINGTON PUMP & MACHINERY CORPN., 115 Broadway, New York, N. Y. ..*pp. 44, 45, 46, 47*

—Sump

AMERICAN STEAM PUMP CO., Battle Creek, Mich...*p. 562*
DAYTON-DOWD CO., Quincy, Ill...*p. 566*
ECONOMY PUMPING MACHINERY CO., 104-118 No. Curtis St., Chicago, Ill...*p. 568*
*GOULDS MFG. CO., Seneca Falls, N. Y... *pp. 570, 571, 572, 573*
Plant Engineering & Equipment Co. (Inc.), 192 Broadway, New York, N. Y.
*SCHUTTE & KOERTING CO., 1184 Thompson St., Philadelphia, Pa...*p. 159*
Twinvolute Pump & Mfg. Co., 216-228 High St., Newark, N. J.
UNION ENGINEERING CO., Cleveland, Ohio ..*p. 645*
YEOMANS BROS. CO., 1426 Dayton St., Chicago, Ill...*p. 584*

—Tank

Advance Pump & Compressor Co. Battle Creek, Mich...*p. 562*
AMERICAN STEAM PUMP CO., Battle Creek, Mich...*p. 256*
*COLE, R. D. MFG. CO., Newnan, Ga...*p. 63*
DEMING CO., Salem, Ohio..*p. 567*
ECONOMY PUMPING MACHINERY CO., 104-118 No. Curtis St., Chicago, Ill...*p. 568*
FAIRBANKS, MORSE & CO., 900 S. Wabash Ave., Chicago, Ill...*p. 41*
*GOULDS MFG. CO., Seneca Falls, N. Y... *pp. 570, 571, 572, 573*
*INGERSOLL-RAND CO. (A. S. Cameron Steam Pump Works), 11 Broadway, New York, N. Y...*p. 564*
Lucas-Miner Pump Co., Springfield, Ohio
LUITWIELER PUMPING ENGINE CO., Rochester, N. Y...*p. 569*
McGOWAN, JOHN H. CO., Cincinnati, Ohio ..*pp. 574, 575*
Rielly, J. J. Mfg. Co., 119 N. 10th St. Louisville, Ky.
Twinvolute Pump & Mfg. Co., 216-228 High St., Newark, N. J.
*UNION STEAM PUMP CO., Battle Creek, Mich...*p. 582*
WARREN STEAM PUMP CO., Warren, Mass. ..*p. 583*
*WHEELER CONDENSER & ENGINEERING CO., Carteret, N. J...*p. 162*
*WHEELER, C. H. MFG. CO., Sedgley & Lehigh Ave., Philadelphia, Pa...*p. 163*

Digitized by Google

*WORTHINGTON PUMP & MACHINERY CORPN., 115 Broadway, New York, N. Y. ..*pp. 44, 45, 46, 47*
YEOMANS BROS. CO., 1426 Dayton St., Chicago, Ill...*p. 584*

—Tar
BEACH-RUSS CO., 50 Church St., New York, N. Y...*p. 560*
BLACKMER ROTARY PUMP CO., Petoskey, Mich...*p. 563*
FAIRBANKS, MORSE & CO., 900 S. Wabash Ave., Chicago, Ill...*p. 41*
*GOULDS MFG. CO., Seneca Falls, N. Y. ..*pp. 570, 571, 572. 573*
*TABER PUMP CO., 291 Elm St., Buffalo, N. Y...*p. 581*
*UNION STEAM PUMP CO., Battle Creek, Mich...*p. 582*

—Turbine
*ALLIS-CHALMERS MFG. CO., Milwaukee, Wis...*pp. 28, 29*
AMERICAN STEAM PUMP CO., Battle Creek, Mich...*p. 562*
DAYTON-DOWD CO., Quincy, Ill...*p. 566*
Dayton Turbine Pump Co., W. 4th & Cuyahoga Ave., Cleveland, Ohio
*DE LAVAL STEAM TURBINE CO., Trenton, N. J...*p. 22*
ECONOMY PUMPING MACHINERY CO., 104-118 No. Curtis St., Chicago. Ill...*p. 568*
*GOULDS MFG. CO., Seneca Falls, N. Y. ..*pp. 570, 571, 572. 573*
*INGERSOLL-RAND CO. (A. S. Cameron Steam Pump Works), 11 Broadway, New York, N. Y...*p. 564*
Jackson, Bryan Iron Works, 401 Sharon Bldg., San Francisco, Cal.
*KERR TURBINE CO., Wellsville, N. Y... *p. 23*
Kingsford Foundry & Machine Works, Oswego, N. Y.
Lea-Courtenay Co., 19 Maine St., New York, N. Y.
*MORRIS MACHINE WORKS, Baldwinsville, N. Y...*pp. 578, 579*
PELTON WATER WHEEL CO., 1982 Harrison St., San Francisco, Cal...*pp. 34, 35*
*TERRY STEAM TURBINE CO., Hartford, Conn...*pp. 26, 27*
UNION ENGINEERING CO., Cleveland, Ohio ...*p. 645*
*UNION STEAM PUMP CO., Battle Creek, Mich...*p. 582*
*WESTINGHOUSE ELECTRIC & MFG. CO., East Pittsburgh, Pa...*pp. 160, 161*

—Vacuum
Advance Pump & Compressor Co., Battle Creek, Mich.
American Air Compressor Works, 26 Cortlandt St., New York, N. Y.
AMERICAN STEAM PUMP CO., Battle Creek, Mich...*p. 562*
BEACH-RUSS CO., 50 Church St., New York, N. Y...*p. 560*
Bishop & Babcock Co., E. 49th & Hamilton Ave., Cleveland, Ohio
BIDDLE, JAMES G. 1211-1213 Arch St., Philadelphia, Pa...*p. 298*
Buffalo Foundry & Machine Co., 41 Winchester Ave., Buffalo, N. Y.
BURY COMPRESSOR CO., 1701 Cascade St., Erie, Pa...*p. 545*
Chalmers Pump & Mfg. Co. ("Canton-Hughes"), Lima, Ohio
CHICAGO PNEUMATIC TOOL CO. ("Chicago Pneumatic"), 6 E. 44th St., New York, N. Y...*p. 548*
Chicago Pump Co., 2344 Wolfram St., Chicago, Ill.
Clark & Norton Mfg Co., Wellsville, N. Y.
Connersville Blower Co., Connersville, Ind.
Crescent Sales & Engrg. Co. ("Roto Piston") Detroit, Mich.
*CROSBY STEAM GAUGE & VALVE CO., 40 Central St., Boston, Mass...*pp. 202, 208*
Crowell Mfg. Co., 296 Taaffe Place, Brooklyn. N. Y.
*DAVIDSON, M. T. CO. ("Davidson"), 154 Nassau St., New York, N. Y...*p. 565*
DEMING CO., Salem, Ohio..*p. 567*
DEVINE, J. P. CO., 1375 Clinton St., Buffalo, N. Y...*pp. 606, 607*
Dravo Co., 95 Liberty St., New York, N. Y.
ECONOMY PUMPING MACHINERY CO., 104-118 No. Curtis St., Chicago, Ill...*p. 568*
Emerson Pump & Valve Co. (Inc.), Alexandria, Va.
FAIRBANKS, MORSE & CO., 900 S. Wabash Ave., Chicago, Ill...*p. 41*
Foster Pump Works, 86 Bridge St., Brooklyn, N. Y.
*GOULDS MFG. CO., Seneca Falls, N. M. ..*pp. 570, 571, 572. 573*
Guild & Garrison, 468 Kent Ave., Brooklyn, N. Y.
Hubbard's, Norman Sons, 165 Water St., Brooklyn, N. Y.
*INGERSOLL-RAND CO. ("Ingersoll-Rand") ("Imperial"), 11 Broadway, New York, N. Y...*pp. 546, 547*
*INGERSOLL-RAND CO. (A. S. Cameron Steam Pump Works), 11 Broadway, New York, N. Y...*p. 564*
Johnson, S. T. Co., 1337 Mission St., San Francisco, Cal.
Kruger & Blind Co., 513 Master St., Philadelphia, Pa.
*LAMMERT & MANN CO., Wood & Walnut Sts., Chicago, Ill...*p. 561*
Leiman Bros., 81 Walker St., New York, N. Y.
McGOWAN, JOHN H. CO., Cincinnati, Ohio ..*pp. 574, 575*
MANISTEE IRON WORKS ("Roturbo"), Manistee, Mich...*pp. 158, 576*
Miller Improved Gas Engine Co., Springfield. Ohio
Nash Engineering Co. ("Hytor"), South Norwalk, Conn.
National Steam Pump Co., Upper Sandusky, Ohio
Oliver Mfg. Co., Fourth & Madison Sts., Oakland, Cal.
Pennsylvania Pump & Compressor Co., Easton, Pa.
Plant Engineering & Equipment Co. (Inc.), 191 Broadway, New York, N. Y.
Pulsometer Steam Pump Co., 220 West 42nd St., New York, N. Y.
SANDUSKY FOUNDRY & MACHINE CO., Sandusky, Ohio..*p. 646*
Shenck Mfg. & Supply Co., Parkers Landing. Pa.
*SCHUTTE & KOERTING CO., 1184 Thompson St., Philadelphia, Pa...*p. 159*
SULLIVAN MACHINERY CO., 120 S. Michigan Ave., Chicago, Ill...*p. 549*
Thompson Mfg. Co., Des Moines, Iowa
*UNION STEAM PUMP CO., Battle Creek, Mich...*p. 582*
Utility Compressor Co., 1161-1165 Harper Ave., E. Detroit, Mich.
Viking Pump Co., Cedar Falls, Iowa
Vogt Bros. Mfg. Co., 1428 W. Main St., Louisville, Ky.
Wagener Steam Pump Co., Canton, Ohio
WARREN STEAM PUMP CO., Warren, Mass. ..*p. 583*
*WESTINGHOUSE ELECTRIC & MFG. CO., East Pittsburgh, Pa...*pp. 160, 161*

Pu

Digitized by Google

PUMPS (Continued)
*WHEELER CONDENSER & ENGINEERING CO., Carteret, N. J...*p. 162*
*WHEELER, C. H. MFG. CO. ("Radojet," "Rotrex," "Mullan"), Sedgley & Lehigh Aves., Philadelphia, Pa...*p. 163*
WILBRAHAM-GREEN BLOWER CO., Pottstown, Pa...*p. 559*
York Electric & Machine Co., 30-34 N. Penn St., York Pa.
Young Pump Co., 10 S. Main St., Michigan City Ind.

—Water Circulating (Engine)
AMERICAN STEAM PUMP CO., Battle Creek, Mich...*p. 562*
Chicago Pump Co., 2344 Wolfram St., Chicago, Ill.
*GOULDS MFG. CO., Seneca Falls, N. Y. ..*570, 571, 572, 573*
Twinvolite Pump & Mfg. Co., 126-228 High St., Newark, N. J.
Fulflo Pump Co., Blanchester, Ohio

—Windmill
DEMING CO., Salem, Ohio..*p. 567*
*GOULDS MFG. CO., Seneca Falls, N. Y. ..*pp. 570, 571, 572, 573*
Hazen Mfg Co., Hudon, Mich.
Leader-Trahern Products Co., Rockford, Ill.
Peters Pump Co., Kewanee, Ill.

PUMP PRIMERS (For Centrifugals)
*LAMMERT & MANN CO., Wood & Walnut Sts., Chicago, Ill...*p. 561*

PUNCH PRESS WORK
Affa Specialty Co., 34 Southbridge St., Worcester, Mass.
Sherman Klove Co., 4640 W. Harrison St., Chicago, Ill.

PUNCHES
—Hydraulic
Henderer's, A. L. Sons, Wilmington, Del.
WATSON-STILLMAN CO., 35 Church St., New York, N. Y...*p. 596*
WOOD, R. D. & CO., Philadelphia, Pa...*p. ..597*

—Metal (Hand Power)
BERTSCH & CO., Cambridge City, Ind...*p. ..442*
Whitney Metal Tool Co., 110 Forbes St., Rockford, Ill.

—Metal (Power)
Kling Bros. Engineering Works, 1300 N. Kostner Ave., Chicago, Ill.

—Multiple
BERTSCH & CO., Cambridge City, Ind...*p. ..442*
*BLISS, E. W. CO., Brooklyn, N. Y...*pp. ..438, 439*
*LONG & ALLSTATTER CO., Hamilton, Ohio ..*pp. 440, 441*
NIAGARA MACHINE & TOOL WORKS, Buffalo, N. Y...*p. 443*
NILES-BEMENT-POND CO., 111 Broadway, New York, N. Y...*p. 470*
Thomas Spacing Machine Co., 1226 Fulton Bldg., Pittsburgh, Pa.

—Power
Alvord Reamer & Tool Co., Millersburg, Pa.
BERTSCH & CO., Cambridge City, Ind...*p. ..442*
*BLISS, E. W. CO. ("Stiles." "Bliss"), Brooklyn, N. Y...*pp. 438, 439*
Clark Foundry Co., Rumford, Me.
Dudgeon, Richard, Broome & Columbia Sts., New York, N. Y.
Enterprise Machinery Co. ("Emco"), 30 S. Clinton St., Chicago, Ill.
Hendley & Whittemore Co., Beloit, Wis.
Imperial Machine Co., 1611 Central Ave., Minneapolis, Minn.
*LONG & ALLSTATTER CO., Hamilton, Ohio..*pp. 440, 441*
NIAGARA MACHINE & TOOL WORKS, Buffalo, N. Y...*p. 443*
Wickes Bros., Saginaw, Mich.

—Structural Shapes
*LONG & ALLSTATTER CO., Hamilton, Ohio..*pp. 440, 441*

PUNCHES AND DIES
BERTSCH & CO., Cambridge City, Ind...*p. 442*
*BLISS, E. W. CO., Brooklyn, N. Y...*pp. 438, 439*
Cleveland Punch & Sheer Works Co., 3917 St. Clair Ave., Cleveland, Ohio
Cleveland Steel Tool Co., 660 E. 82nd St., Cleveland, Ohio
Diamant Tool & Mfg. Co., Inc., 91-97 Runyon St., Newark, N. J.
DOVE-SMITH & SON, Niagara Falls, N. Y. ..*p. 492*
Lewthwaite, T. H. Machine Co., 411 E. 31st St., New York, N. Y.
MARCHANT, GEO. F. CO., 1420-28 S. Rockwell St., Chicago, Ill...*p. 505*
Nestor Mfg Co., 40 W. 13th St., New York, N. Y.
*PRATT & WHITNEY CO., 111 Broadway, New York, N. Y...*p. 471*
Richards, I. P. Co., 23 Pemberton Street, Providence, R. I.
Smith, R. G. Tool Mfg. Co., 315 Market St., Newark, N. J.
Thomas Spacing Machine Co., 1226 Fulton Bldg., Pittsburgh, Pa.
TORRINGTON MFG. CO., Torrington, Conn. ..*p. 641*
Weiss, Louis T., 295 Taafee Place, Brooklyn, N. Y.

PUNCHING AND COPING MACHINES
BERTSCH & CO., Cambridge City, Ind...*p. 442*
*LONG & ALLSTATTER CO., Hamilton, Ohio..*pp. 440, 441*
NILES-BEMENT-POND CO., 111 Broadway, New York, N. Y...*p. 470*
Wickes Bros., Saginaw, Mich.

PUNCHING AND SHEARING MACHINES
Badger State Machine Co., Janesville, Wis.
BERTSCH & CO., Cambridge City, Ind...*p. 442*
*BLISS, E. W. CO., Brooklyn, N. Y...*pp. 438, 439*
Beatty Machine & Mfg Co., Hammond, Ind.
Covington Machine Co., Covington, Va.
Excelsior Tool & Machine Co., East St. Louis, Ill.
Federal Engineering Co., 588 Drexel Bldg., Philadelphia, Pa.
Hendley & Whittemore Co., Beloit, Wis.
Hilles & Jones Co., Wilmington, Del.
Ironton Punch & Sheer Co., 511 N. 2nd St., Ironton, Ohio
Kane & Roach, Niagara & Shonnard Sts., Syracuse, N. Y.
New Doty Mfg. Co., Janesville, Wis.
NILES-BEMENT-POND CO., 111 Broadway, New York, N. Y...*p. 470*
Pels, Henry & Co., 90 West St., New York, N. Y.
Rock River Machine Co., Janesville, Wis.
*ROYERSFORD FOUNDRY & MACHINE CO. (Inc.), 52 N. 5th St., Philaelphia, Pa. ..*pp. 346, 347*
Shatz Mfg. Co., Poughkeepsie, N. Y.
Slocomb, F. F. & Co. (Inc.), Wilmington, Del.
Southwark Foundry & Machine Co., 400 Washington Ave., Philadelphia, Pa.
Thomas Spacing Co., 1225 Fulton Bldg. Pittsburgh, Pa.

Digitized by Google

Wickes Bros. Saginaw, Mich.
Williams, White & Co.. Moline, Ill.

PURIFIERS

—Ammonia
*VILTER MFG. CO., 1194-1196 Clinton St., Milwaukee, Wis...*pp. 16, 17*

—Feed Water
(See Heaters and Purifiers, Feed Water)

PYROMETERS

—Electric
*BRISTOL CO., Waterbury, Conn...*p. 291*
BROWN INSTRUMENT CO. ("Brown"), Philadelphia, Pa...*p. 292*
Englehard, Charles, 30 Church St., New York, N. Y.
*FOXBORO CO. (Inc.), Foxboro, Mass...*p. 293*
Frink Pyrometer Co., Lancaster, Ohio
Hoskins Mfg. Co., 4437 Lawton Ave., Detroit, Mich.
Leeds & Northrup Co., 4901 Stenton Ave., Philadelphia, Pa.
Morse Thermo-Gage Co. (Inc.), 111 Eddy St., Ithaca, N. Y.
Price Electric Co., 12,369 Euclid Ave., Cleveland, Ohio
Pyrolectric Instrument Co., ("Northrup"), 636-640 E. State St., Trenton, N. J.
Queen-Gray Co ,.616-60 Chestnut St., Phliadelphia, Pa.
*SUPERHEATER COMPANY, 17 E. 42nd St., New York, N. Y...*p. 98*
Taylor Instrument Co. ("Tycos"), Rochester, N. Y.
Thwing Instrument Co., 3339 Lancaster Ave., Philadelphia, Pa.
*WESTINGHOUSE ELECTRIC & MFG. CO., East Pittsburgh, Pa...*p. 160, 161*
WHITE, S. S. DENTAL MFG. CO., 84 Market St., New York, N. Y...*p. 359*
Wilson-Maeulen Co., 781 E. 142nd St., New York, N. Y.

—Optical
Morse-Thermo-Gage Co. (Inc.), 111 Eddy St., Ithaca, N. Y.
Scientific Materials Co., 709-719 Forbes St., Pittsburgh, Pa.
Shore Instrument Co., 9025-9029 Van Wyck Ave., Jamaica, N. Y.
Zaubitz, A., 95-97 Cliff St., New York, N. Y.

—Pneumatic
*UEHLING INSTRUMENT CO., 2011 Empire Bldg., New York, N. Y...*p. 286*

—Potentiometer System
BROWN INSTRUMENT CO. ("Brown"), Philadelphia, Pa...*p. 292*

—Radiation
BROWN INSTRUMENT CO. ("Brown") Philadelphia, Pa...*p. 292*
Thwing Instrument Co., 3339 Lancaster Ave., Philadelphia, Pa.

—Resistance
Thwing Instrument Co., 3339 Lancaster Ave., Philadelphia, Pa.

PYROXYLIN APPARATUS
BURROUGHS, CHARLES CO. (THE), Newark, N. J...*p. 590*

Q

QUARRYING MACHINERY
*INGERSOLL-RAND CO., 11 Broadway, New York, N. Y...*pp. 546, 547*
SULLIVAN MACHINERY CO., 120 S. Michigan Ave., Chicago, Ill...*p. 549*

QUENCHING MACHINES
AMERICAN GAS FURNACE CO., Elizabeth, N. J...*p. 527*
Machine Products Co., E. 179th St. & St. Clair Ave., Cleveland, Ohio

R

RACKS

—Bar Stock
NEW BRITAIN MACHINE CO., New Britain, Conn...*p. 463*

—Cast
*JONES, W. A. FOUNDRY & MACHINE CO., 4416 West Roosevelt Road, Chicago, Ill...*pp. 312, 313, 314, 315*

—Machine Cut
*JAMES, D. O. MFG. CO., 1114-24 W. Monroe St., Chicago, Ill...*pp. 310, 311*
*JONES, W. A. FOUNDRY & MACHINE CO., 4415 W. Roosevelt Road, Chicago, Ill...*pp. 312, 313, 314, 315*
Meisselbach-Catucci Mfg. Co., 57 Stanton St., Newark, N. J.
Standard Gauge Steel Co., Beaver Falls, Pa.

—Pipe
Brown Engineering Co., Reading, Pa.

—Tool
Cleveland Wire Spring Co., East 38th & Hamilton Ave., Cleveland, Ohio
NEW BRITAIN MACHINE CO., New Britain, Conn...*p. 463*

RADIATOR TRAPS
(See Traps, Radiator)

RADIATORS

—Engine Cooling
Modine Mfg. Co., Racine, Wis.

—Gas
Minnesota Radiator Co., Foot of 59th Ave., West Duluth, Minn.

—Gas-Steam
CLOW, JAMES B. & SONS, ("Gasteam"), 534 So. Franklin St., Chicago, Ill...*p. 230, 231*

RADIATORS, STEAM AND WATER
American Radiator Co., 816-822 S. Michigan Ave., Chicago, Ill.
CLOW, JAMES B. & SONS, 534 So. Franklin St., Chicago, Ill...*pp. 230, 231*
Gurney Heater Mfg. Co., 188-200 Franklin St, Boston, Mass.
KEWANEE BOILER CO., Kewanee, Ill...*pp. 622, 623, 624*
Minnesota Radiator Co., Foot of 59th Ave., West Duluth, Minn.
Modine Mfg. Co., Racine, Wis
NASON MFG. CO., 71 Fulton St., New York, N. Y...*p. 216*
PIERCE, BUTLER & PIERCE MFG. CORPN, 437 East 162nd St., New York, N. Y...*p. 204*
*SMITH, H. B. CO., Westfield, Mass...*pp. 626, 627*
United States Radiator Corpn., ("Triton"), 35 E. Grand River Ave., Detroit, Mich.

RAIL BREAKING MACHINERY
Ironton Punch & Shear Co., 511 N. 2nd St., Ironton, Ohio

RAIL SAWS (Portable)
INDUSTRIAL WORKS, Bay City, Mich...*pp. 392, 393*
Racine Tool & Machine Co., Racine, Wis.

RAILINGS, PIPE
*CRANE CO., 836 S. Michigan Ave., Chicago, Ill...*pp. 170, 171, 172, 173*
Pancoast, Henry B. & Co., 940-962 N. Front St., Philadelphia, Pa.

Ra

Digitized by Google

RAILROAD TRACK SCALES
(See Scales, Railroad Track)

RAILS, STEEL
Koppel Industrial Car & Equipment Co., Koppple, Beaver Co.. Pa.
Lackawanna Steel Co., Buffalo, N. Y.
Rownson Drew & Clydesdale (Inc.), 68 William St., New York, N. Y.

RAILWAY SPECIALTIES
American Steel Foundries, 1163 McCormick Bldg., Chicago, Ill.
*BARCO MFG. CO., Chicago, Ill...*p. 240*
Franklin Railway Supply Co., 17 E. 42nd St., New York, N. Y.

RAILWAYS
—Cable and Automatic
HUNT, C W. CO. (Inc.), West New Brighton, Staten Island, N. Y...*pp. 374, 375*

—Industrial
Atlas Car & Mfg. Co., Cleveland. Ohio
Easton Car & Construction Co.. Rm. 679. 50 Church St., New York, N. Y.
HUNT, C W. CO (Inc.), West New Brighton, Staten Island, N. Y...*pp. 374, 375*
Koppel Industrial Car & Equipment Co., Koppel, Beaver Co., Pa.
Turl Iron & Car Co. (Inc.), 50 Broad St., New York, N. Y.

RAMMERS, FOUNDRY
CHICAGO PNEUMATIC TOOL CO. (''Keller''), 6 E. 44th St., New York, N. Y...*p. 548*
Cleveland Pneumatic Tool Co., 6410 Hawthorne Ave., Cleveland, Ohio
Dayton Moulding Machine Co., Dayton, Ohio
Herman Pneumatic Machine Co., Pittsburgh, Pa.
*INGERSOLL-RAND CO., (''Little David''). 11 Broadway, New York, N. Y...*pp. 546, 547*

RAMS, HYDRAULIC
DEMING CO., Salem, Ohio..*p. 567*
Niagara Hydraulic Engine Co., Chester, Pa.
Rife Engine Hydraulic Mfg. Co., 90 West St., New York, N. Y.

RASPS
Hayes File Co.. 1986 Franklin St., Detroit, Mich.

RATTLERS (Engine Flue)
Baird Pneumatic Tool Co., Rialto Bldg., Kansas City, Mo.

REAMERS
Advance Tool Co., Canal & Jackson Sts., Cincinnati, Ohio
Alvord Reamer & Tool Co., Millersburg, Pa.
American Machine Products Co., 18th & Howard Sts., Detroit, Mich.
Bridgeport Cutter Works (Inc.), 50 Reamer St., Bridgeport. Conn.
Brubaker, W. L. & Bros., 50 Church St., New York, N. Y.
Buckeye Twist Drill Co., Alliance, Ohio
Butterfield & Co., Derby Line, Vt.
CLEVELAND TWIST DRILL CO., Cleveland, Ohio..*p. 502*
Cogsdill Mfg. Co., 5132 Grand River Ave., Detroit, Mich.
Conant & Donelson Co. (''Reliable'') Conway, Mass.
Davidson Tool Mfg. Corpn., 120-124 Maiden Lane, New York, N. Y.
Detroit Reamer & Tool Co., 302 Congress St., East Detroit, Mich.
Detroit Twist Drill Co., 634 Fort St., West Detroit, Mich.
Fastfeed Drill & Tool Corpn. (''Fastfeed''), Clinton & Oakwood Sts., Toledo, Ohio
Foster-Johnson Reamer Co.. Elkhart, Ind.
Gale-Sawyer Co., 36 Oliver St., Boston, Mass.
ILLINOIS TOOL WORKS, 154 E. Erie St., Chicago, Ill...*p. 503*
Latrobe Tool Co., Latrobe, Pa.
McCrosky Tool Corpn., Meadville, Pa.
Maddaus Tool Corpn., 90 West St., New York, N. Y.
Merganthaler Co., 116 Hollingsworth St., Baltimore. Md.
National Twist Drill & Tool Co., Brush near Boulevard, Detroit, Mich.
Rich Tool Co., 513 Railway Exchange, Chicago, Ill.
Union Twist Drill Co., Athol, Mass.
Whitman & Barnes Mfg. Co., 114 E. Buchtel Ave., Akron, Ohio

—Adjustable and Expansion
Chadwick & Trefethen (''Critshley''), 32 Bow St., Portsmouth, N. H.
CLEVELAND TWIST DRILL CO. (''Paradox'' ''Peerless'') Cleveland, Ohio .*p. 502*
Cutter & Wood Supply Co., 274 Friend St., Boston, Mass.
Davis Boring Tool Co, (''Davis'') 3722 Forest Park Bldg., St. Louis, Mo.
Foster-Johnson Reamer Co., Elkhart, Ind.
Kelly Reamer Co., 3705 W. 73rd St., Cleveland, Ohio
McCrosky Tool Corpn. (''McCrosky-Super''), Meadville. Pa.
NATIONAL TOOL CO. (''National-Cleveland''), Cleveland, Ohio..*p. 504*
PRATT & WHITNEY CO., 111 Broadway, New York, N. Y...*p. 471*
Rogers, John M. Works (Inc.), Gloucester City, N. J.
Schellenbach-Hunt Tool Co., 116-124 Opera Pl., Cincinnati Ohio
Taft-Peirce Mfg. Co., Woonsocket, R. I.

REAMING AND COUNTERSINKING MACHINES
Lakeside Bridge & Steel Co. (''Labride''), 404 Villard Ave., North Milwaukee, Wis.

RECEIVERS
—Air
BROWNELL CO., Dayton, Ohio...*p. 59*
BURY COMPRESSOR CO., 1701 Cascade St., Erie, Pa...*p. 545*
CHICAGO PNEUMATIC TOOL CO., 6 E. 44th St., New York, N. Y...*p. 548*
FROST MFG. CO., 112 W. Adams St., Chicago, Ill...*pp. 68, 634*
*INGERSOLL-RAND CO., 11 Broadway, New York, N. Y...*pp. 546, 547*
KEWANEE BOILER CO., Kewanee, Ill...*pp. 622, 623, 624*
KOVEN, L. O. & BRO., 154 Ogden Ave., Jersey City, N. J...*p. 605*
LANCASTER IRON WORKS (Inc.), Lancaster, Pa...*pp. 656, 657*
LASKER IRON WORKS, 3201 So. Lincoln St., Chicago, Ill...*p. 655*
MILWAUKEE RELIANCE BOILER WORKS (''Reliance''), Milwaukee, Wis...*p. 143*
MORRISON BROS., Dubuque, Iowa...*p. 658*
PANGBORN CORPN., P. O. Box 859, Hagerstown, Md...*pp. 636, 637*
Pennsylvania Boiler Works, 12th & Penna. Ave., Erie, Pa.
Ruemmeli-Dawley Mfg. Co., 3923 Chouteau Ave., St. Louis, Mo.
Steel Tank & Products Corpn., 26 N. Jefferson St., Chicago, Ill.
*TITUSVILLE IRON WORKS CO., Titusville, Pa...*p. 89*
Tudor Boiler Mfg. Co., 715 E. Third St., Cincinnati, O.
WESTINGHOUSE TRACTION BRAKE CO., Wilmerding, Pa...*p. 550, 551*
*WHEELER CONDENSER & ENGINEERING CO., Carteret, N. J...*p. 162*

Digitized by Google

*WORTHINGTON PUMP & MACHINERY CORPN., 115 Broadway, New York, N. Y. ..*pp. 44, 45, 46, 47*

—Ammonia
Pittsburgh Pipe Coil & Bending Co., P. O. Box 975, Pittsburgh, Pa.
YORK MFG. CO., York, Pa...*p. 631*

RECORDING INSTRUMENTS
(See Instruments, Recording)

RECORDERS: See
Combustion (CO_2)
Instruments
Motion
Operation
Revolution
Smoke
Time
Watchman's

RECTIFIERS
*GENERAL ELECTRIC CO., Schenectady, N. Y...*pp. 18, 19, 20, 21*

RED LEAD
National Lead Co. (''Dutch Boy''), 111 Broadway, New York, N. Y.

REELS, METAL
AMERICAN INSULATING MACHINERY CO., Philadelphia, Pa...*p. 638*
AMERICAN PULLEY CO., 4200 Wissahickon Ave., Philadelphia, Pa...*p. 322*
Mossberg, Frank Co., Lamb Street, Attleboro, Mass.
Nilson, A. H. Machine Co., 1525 Railroad Ave., Bridgeport, Conn.

REFLECTORS (Electric Light)
Hubell, Harvey (Inc.), State St. & Bostwick Ave., Bridgeport, Conn.
Wheeler Reflector Co., 156 Pearl St., Boston, Mass.

REFRACTORIES
Ashland Fire Brick Co., Ashland, Ky.
*CRESCENT REFRACTORIES CO., Curwensville, Clearfield County, Pa...*p. 136*
Green, A. P. Fire Brick Co., Mexico, Mo.
Hoffman, Chas. V. Co. (Inc.), (''AlSiO''). 95 Liberty St., New York, N. Y.
*JOHNS-MANVILLE (Inc.), New York, N. Y...*p. 244*
*KING REFRACTORIES CO. (Inc.), (''Flame Brand''), 1709 Niagara St., Buffalo, N. Y...*p. 137*
NORTON CO. (''Alundum'', ''Crystolon''), Worcester, Mass...*pp. 489, 510*
*QUIGLEY FURNACE SPECIALTIES CO., 26 Cortlandt St., New York, N. Y...*pp. 129, 138, 139*
Southern Refractories Co., Fort Payne, Ala.
Taylor, Charles Sons Co., 706 Burns St., Cincinnati, Ohio
Union Mining Co., 1113 Fidelity Bldg., Baltimore, Md.

REFRIGERATING MACHINERY
American Carbonic Machinery Co., Wisconsin Rapids, Wis.
Arctic Ice Machine Co., Canton, Ohio
Armstrong Machinery Co., 3201-3219 E. Riverside, Spokane, Wash.
AUTOMATIC CARBONIC MACHINE CO., Peoria, Ill...*p. 628*
AUTOMATIC REFRIGERATING CO., Hartford, Conn...*p. 629*
Baker Ice Machine Co., Omaha, Neb.
Ball Ice Machine Co., 3003 N. Broadway, St. Louis, Mo.
Brunswick Refrigerating Co., New Brunswick, N. J.
Buffalo Refrigerating Machine Co., (''Carbonia''), 39 Lafayette St., New York, N. Y.
CARBONDALE MACHINE CO., Carbondale, Pa...*p. 630*
Castle Refrigerating Machine Co., Indianapolis, Ind.
Cincinnati Refrigerating Machinery Co., Lincoln Ave. & C. L. & N. R. R., Cincinnati, O.
Clothel Refrigerating Co., 61 Broadway, New York, N. Y.
Continental Machinery Company, 111 West Monroe St., Chicago, Ill.
*DE LA VERGNE MACHINE CO., 1123 E. 138th St., New York, N. Y...*p. 40*
Frick Co. (Inc.), Waynesboro, Pa.
G. E. Engineering Co. (Inc.), 22 Laight St., New York, N. Y.
Harris Ice Machine Works, 174 E. Water St., Portland, Ore.
HOPE ENGINEERING & SUPPLY CO., Mt. Vernon, Ohio...*p. 49*
Howe Ice Machine Co., 2825 Montrose Ave., Chicago, Ill.
Isbell-Porter Co., 46 Bridge St., Newark, N. J.
Jarvis Engineering Co., 51 Ellery St., Boston, Mass.
*JOHNS-MANVILLE (Inc.), (''Audiffren-Singrun''), New York, N. Y...*p. 244*
Mayer Ice Machine & Engineering Co., Westside and Grant Aves., Jersey City, N. J.
New Method Utilities Co., 45 Academy St., Newark, N. J.
Norwalk Iron Works Co., So. Norwalk, Conn.
Pennsylvania Engineering Co., 119-21 N. Howard St., Philadelphia, Pa.
Phoenix Ice Machine Co., 2711 Church Ave., Cleveland, Ohio
Remington Machine Co., Wilmington, Del.
Roekler, H. B., 41 Maiden Lane, New York, N. Y.
Schantz, K. W., Inc., 78 Main St., Buffalo, N. Y.
Toledo Coldmaker Co., 1690 Fernwood Ave., Toledo, Ohio
Triumph Ice Machine Co. (''Triumph''), 3058 South St., Cincinnati, Ohio
United Iron Works, Oakland, Cal.
Vesterdahl, Karl & Co., 90 West St., New York, N. Y.
*VILTER MFG. CO., 1194-1196 Clinton St., Milwaukee, Wis...*p. 16, 17*
Vulcan Iron Works, 1849 Kearney St., San Francisco, Cal.
Winkler Ice Machine Co., 1752 N. 29th St., Philadelphia, Pa.
Wittenmeier Machinery Co., 852 N. Spaulding Ave., Chicago, Ill.
YORK MFG. CO., York, Pa...*p. 631*

—Automatic
American Carbonic Machinery Co., Wisconsin Rapids, Wis.
AUTOMATIC CARBONIC MACHINE CO., Peoria, Ill...*p. 628*
AUTOMATIC REFRIGERATING CO., Hartford, Conn...*p. 629*
Hallam, F. W., 80 Stanhope St., Brooklyn, N. Y.

—Carbonic Acid
American Carbonic Machinery Co., Wisconsin Rapids, Wis.
Wittenmeier Machinery Co., 852 N. Spaulding Ave., Chicago, Ill.

REGULATORS
—Blower
CASH, A. W. CO., Decatur, Ill...*p. 205*
FOSTER ENGINEERING CO., Newark, N. J. ..*p. 209*
McDonough Coal Saving Corpn., 3960 Grand River Ave., Detroit, Mich.
WING, L. J. MFG. CO., 352 W. 13th St., New York, N. Y...*pp. 107, 625*
Ziermore Valve Co., Media, Pa.

Re

Digitized by Google

REGULATORS (Continued)

—Combination for Digesters

Locke Regulator Co., 76 North St., Salem, Mass.

—Compressed Gas

BASTIAN-BLESSING CO. ("Refo"), 125 W. Austin Ave., Chicago, Ill...*p. 539*

CASH, A. W. CO., Decatur, Ill...*p. 205*

—Damper

AMERICAN DISTRICT STEAM CO. ("Adsco"), North Tonawanda, N. Y...*p. 242*

Atlas Valve Co., 282-286 South St., Newark, N. J.

Bushnell, John S. & Co., 146 Liberty St., New York, N. Y.

Carrick Engineering Co., 538 So. Clark St., Chicago, Ill.

COPPUS ENGINEERING & EQUIPMENT CO., 342-348 Park Ave., Worcester, Mass. ..*pp. 104, 105*

Defender Automatic Regulator Co., 709 Pine St., St. Louis, Mo.

D'ESTE, JULIAN CO., 26 Canal St., Boston, Mass...*pp. 206, 207*

DUNHAM, C. A. CO., 230 East Ohio St., Chicago, Ill...*p. 227*

Eastwood Wire Mfg. Co., Belleville, N. J.

*ENGINEER CO. ("Balanced Draft"), 17 Battery Pl., New York, N. Y...*p. 108, 109*

Foskett & Bishop Co., New Haven, Conn.

FULTON CO. ("Sylphon"), Knoxville, Tenn. ..*pp. 218, 219*

Hess & Barker, 212-22 So. Darien St., Philadelphia, Pa.

KELLY & JONES CO., Greensburg, Pa... *pp. 182, 183*

*KIELEY & MUELLER (Inc.), ("Kieley"), 34 W. 13th St., New York, N. Y...*p. 212*

Kitts Mfg. Co., Oswego, N. Y.

Kitts Steam Specialty Co., 60 E. 1st St., Oswego, N. Y.

Locke Regulator Co., 76 North St., Salem, Mass.

MASON REGULATOR CO., Boston, Mass... *pp. 214, 215*

OPEN COIL HEATER & PURIFIER CO., Indianapolis, Ind...*p. 149*

Power Turbo-Blower Co., 347 Madison Ave., New York, N. Y.

Robertson, Jas. L. & Son ("Spencer"), 78-80 Murray St., New York, N. Y.

Ruggles-Klingham Mfg. Co., 200 Devonshire St., Boston, Mass.

Spencer Regulator Co. ("Spencer"). Cor. Derby & Liberty Sts., Salem, Mass.

Standard Regulator Co., 282 South St., Newark, N. J.

Thompson, Richard & Co., 187 Greenwich St., New York, N. Y.

Walker Metallic Packing Co., 4617-21 Tacony St., Frankford, Philadelphia, Pa.

Watts Regulator Co. ("Lawrence"), 250-252 Lowell St., Lawrence, Mass.

WEBSTER, WARREN & CO., Camden, N. J. ..*pp. 154, 155*

—Electric

*GENERAL ELECTRIC CO., Schenectady, N. Y...*pp. 18, 19, 20, 21*

Industrial Controller Co., Milwaukee, Wis.

*WESTINGHOUSE ELECTRIC & MFG. CO., East Pittsburgh, Pa...*pp. 160, 161*

—Feed Water

Berry Engineering Co. ("Berry"), Chester, Pa.

Burrows Mfg. Co., 41-43 N. Water St., York, Pa.

Central Machine Co., 7th, Wood & Franklin Sts., Philadelphia, Pa.

Chaplin-Fulton Mfg. Co. ("Vigilant"), 28-36 Penn Ave., Pittsburgh, Pa.

FOSTER ENGINEERING CO., Newark, N. J. ..*p. 209*

FULTON CO. ("Sylphon"), Knoxville, Tenn...*pp. 218, 219*

*KIELEY & MUELLER (Inc.), ("Kieley"), 34 W. 13th St., New York, N. Y...*p. 212*

Kitts Mfg. Co., Oswego, N. Y.

Kitts Steam Specialty Co., 60 E. 1st St., Oswego, N. Y.

McDonough Coal Saving Corpn., 3960 Grand River Ave., Detroit, Mich.

NORTHERN EQUIPMENT CO. ("Copes"), Erie, Pa...*p. 102*

Plouff Co., 1500 River St., Boston, Mass.

"S-C" REGULATOR MFG. CO., Fostoria, Ohio...*p. 103*

Steam Equipment Mfg. Co., 8077 Jenkins Arcade Bldg., Pittsburgh, Pa.

TAGLIABUE, C. J. MFG. CO., 18-88 33rd St., Brooklyn, N. Y...*p. 296*

Watts Regulator Co., 250-252 Lowell St., Lawrence, Mass.

Williams Gauge Co., 543 Fourth Ave., Pittsburgh, Pa.

—Hot Water Tank

Atlas Valve Co., 282 South St., Newark, N. J.

—Humidity

TAGLIABUE, C. J. MFG. CO., 18-88 33rd St., Brooklyn, N. Y...*p. 206*

—Hydraulic Pressure

FOSTER ENGINEERING CO., Newark, N. J. ..*p. 209*

—Paper Drying

Locke Regulator Co., 76 North St., Salem, Mass.

—Pressure

BROWN INSTRUMENT CO. ("Brown"), Philadelphia, Pa...*p. 292*

Brunner Mfg. Co., Utica, N. Y.

Bryant Heater & Mfg. Co., 952 East 72nd St., Cleveland, Ohio

CASH, A. W. CO., Decatur, Ill...*p. 205*

Chaplin-Fulton Mfg. Co. ("Fulton"), 28-36 Penn Ave., Pittsburgh, Pa.

Chicago Automatic Switch Co., 212 N. Peoria St., Chicago, Ill.

Connelly Iron Sponge & Governor Co., 227 Fulton St., New York, N. Y.

*CRANE CO., 836 S. Michigan Ave., Chicago, Ill...*pp. 170, 171, 172, 173*

Davis, G. M. Regulator Co., 439 Milwaukee Ave., Chicago, Ill.

D'ESTE, JULIAN CO., 26 Canal St., Boston 14, Mass...*pp. 206, 207*

FISHER GOVERNOR CO., Marshalltown, Iowa...*p. 208*

*FORD REGULATOR CORPN., 402 Broome St., New York, N. Y...*p. 176*

FOSTER ENGINEERING CO., Newark, N. J. ..*p. 209*

*FOXBORO CO. (Inc.), Foxboro, Mass...*p. 293*

Frink Pyrometer Co., Lancaster, Ohio

FULTON CO. ("Sylphon"), Knoxville, Tenn. ..*p. 218, 219*

Hornung, J. C., 343 S. Dearborn St., Chicago, Ill.

KELLY & JONES CO., Greensburg, Pa... *pp. 182, 183*

*KIELEY & MUELLER (Inc.), ("Kieley"), 34 W. 13th St., New York, N. Y...*p. 212*

Klipfel Mfg. Co., 2651 W. Harris St., Chicago, Ill.

LESLIE CO., Lyndhurst, N. J...*p. 213*

MASON REGULATOR CO., Boston, Mass... *p. 214, 215*

Messer Welding Supply Co., 113 Eleventh St., Brooklyn, N. Y.

Mueller, H. Mfg. Co., Decatur, Ill.

National Regulator Co., 200 S. Jefferson St., Chicago, Ill.

OPEN COIL HEATER & PURIFIER CO., Indianapolis, Ind...*p. 149*

Digitized by Google

Refrigerating Specialties Co., 9 S. Clinton St., Chicago, Ill.
Ross Valve Mfg. Co., 4 Oakland Ave., Troy, N. Y.
"S-C" REGULATOR MFG. CO., Fostoria, Ohio...*p. 103*
TAGLIABUE, C. J. MFG. CO., 18-88 33rd St., Brooklyn, N. Y...*p. 296*
UNION WATER METER CO., Worcester, Mass...*p. 276*
Wilgus Mfg. Co. ("Wilgus"), 229 Boyd St., Los Angeles, Cal.
WING, L. J. MFG. CO., 352 W. 13th St., New York, N. Y...*pp. 107, 625*
Ziermore Valve Co., Media, Pa.

—Pump
(See Governors, Pumps)

—Temperature
AMERICAN GAS FURNACE CO., Elizabeth, N. J...*p. 527*
American Thermostat Co., 226 Jelliff Ave., Newark, N. J.
Bishop & Babcock Co., E. 49th & Hamilton Ave., Cleveland, Ohio
*BRISTOL CO., Waterbury, Conn...*p. 291*
BROWN INSTRUMENT CO. ("Brown"), Philadelphia, Pa...*p. 292*
Bryant Heater & Mfg. Co., 952 East 72nd St., Cleveland, Ohio
*CRANE CO., 836 S. Michigan Ave., Chicago, Ill...*pp. 170, 171, 172, 173*
D'ESTE, JULIAN CO., 26 Canal St., Boston, Mass...*pp, 206, 207*
Equitherm Control Corpn., 13 Tillary St., Brooklyn, N. Y.
*FOXBORO CO. (Inc.), Foxboro, Mass...*p. 293*
FULTON CO. ("Sylphon"), Knoxville, Tenn. ..*pp. 218, 219*
Hornung, J. C., 343 S. Dearborn St., Chicago, Ill.
Jewell Mfg. Co., 27 Clark St., Auburn, N. Y.
JOHNSON SERVICE CO., Milwaukee, Wis. ..*pp. 220, 221*
*KIELEY & MUELLER (Inc.), ("Kieley"), 34 W. 13th St., New York, N. Y...*p. 212*
National Regulator Co., 200 S. Jefferson St., Chicago, Ill.
*POWERS REGULATOR CO., 995 Architects Bldg., New York, N. Y...*pp. 222, 223*
Roys' Heat Control Co., 915 Gates Ave., Brooklyn, N. Y.
*SARCO CO. (Inc.), 9 Barclay St., New York, N. Y...*pp. 224, 225*
TAGLIABUE, C. J. MFG. CO., 18-88 33rd St., Brooklyn, N. Y...*p. 296*
Weld, Geo. A. & Co., 79 Milk St., Boston, Mass.
Wilson, H. A. Co., 97 Chestnut St., Newark, N. J.

—Vacuum
CASH, A. W. CO., Decatur, Ill...*p. 205*
FOSTER ENGINEERING CO., Newark, N. J. ..*p. 209*
MASON REGULATOR CO., Boston, Mass... *pp. 214, 215*
TAGLIABUE, C. J. MFG. CO., 18-88 33rd St., Brooklyn, N. Y...*p. 296*

—Water Level
FOSTER ENGINEERING CO., Newark, N. J. ..*p. 209*
FULTON CO. ("Sylphon"), Knoxville, Tenn...*pp. 218, 219*
*KIELEY & MUELLER (Inc.), ("Kieley"). 34 W. 13th St., New York, N. Y...*p. 212*
TAGLIABUE, C. J. MFG. CO., 18-88 33rd St., Brooklyn, N. Y...*p. 296*

REHEATERS, AIR
*INGERSOLL-RAND CO., 11 Broadway, New York, N. Y...*pp. 564, 647*

REPAIR WORK

—Boiler
CONNERY & CO. (Inc.), 2nd and Luzerne Sts., Philadelphia, Pa...*p. 651*
KROESCHELL BROS. CO., 460 West Erie St., Chicago, Ill...*p. 75*
LEBANON BOILER WORKS (J. K. Petty & Co., Inc.), 6 So. 15th St., Philadelphia, Pa...*pp. 78, 79*
PAGE BOILER CO., 817 Larrabee St., Chicago, Ill...*p. 85*
WATERTOWN ENGINE & MACHINE CO., Watertown, N. Y...*p. 51*

—Car
Youngstown Steel Car Co., Niles, Ohio

—Elevator
D'ESTE, JULIAN CO., 26 Canal St., Boston, Mass...*pp. 206, 207*
Roberts, James H. Elevator Co., 430 W. Broadway, New York, N. Y.

—Elevator (Emergency)
Maintenance Co. (Inc.), 449-53 West 42nd St., New York, N. Y.

—Engine
Engine & Machinery Co., Marion Ave. & Navarre Rd. S. W., Canton, Ohio
Hartford Engine Works, 223 State St., Hartford, Conn.
LEBANON BOILER WORKS (J. K. Petty & Co., Inc.), 6 So. 15th St., Philadelphia, Pa...*pp. 78, 79*
WATERTOWN ENGINE & MACHINE CO., Watertown, N. Y...*p. 51*
Watts Campbell Co., 298 Ogden St., Newark, N. J.

—General Machine
BASS FOUNDRY & MACHINE CO., Fort Wayne, Ind...*p. 57*
Central Machine Co., 7th, Wood & Franklin Sts., Philadelphia, Pa.
D'ESTE, JULIAN CO., 26 Canal St., Boston, Mass...*p. 206, 207*
LEBANON BOILER WORKS (J. K. Petty & Co., Inc.), 6 So. 15th St., Philadelphia, Pa...*pp. 78, 79*
Lombard Iron Work & Supply Co., Augusta, Ga.
TORRINGTON MFG. CO., Torrington, Conn. ..*p. 641*
Tranter Mfg. Co., 105 Water St., Pittsburgh, Pa.
Upton & Gilman Machine Co., 587 Middlesex St., Lowell, Mass.
Wendland, C. F. Engineering Construction Co., 63 Wooster St., New York, N. Y.

—Marine
Charleston Dry Dock & Machine Co., East End Calhoun St., Charleston, S. C.

—Motor (Emergency)
Maintenance Co. (Inc.), 449-53 West 42nd St., New York, N. Y.

RESAWS

—Band
ATKINS, E. C. & CO. (Inc.), Indianapolis, Ind...*p. 506*

—Horizontal
McDonough Mfg. Co., Eau Clair, Wis.
Mereen-Johnson Machine Co., Minneapolis, Minn.

—Vertical
McDonough Mfg. Co., Eau Claire, Wis.
Mereen-Johnson Machine Co., Minneapolis, Minn.

RESERVOIRS

—Aerating
*SPRAY ENGINEERING CO. ("Spraco"), 60 High Street, Boston, Mass...*pp. 166, 167*

Digitized by Google

RESERVOIRS (Continued)
—Oil
*RICHARDSON-PHENIX CO., 126 Reservoir Ave., Milwaukee, Wis...*pp. 248, 249*

RETAINERS, BALL
BEARINGS CO. OF AMERICA ("Star"), Lancaster, Pa...*p. 341*
Bossert Corpn., Utica, N. Y.
Nice Ball Bearing Co., Land Title Bldg., Philadelphia, Pa.
Suspension Bearing Co., Spartanburg, S. C.

RETARDERS (Railroad Car)
Fairmont Mining Machinery Co., Fairmont, W. Va.

RETORTS (Fire Clay)
Gardner, James, Jr., Co., Ebensburg, Pa.

REVOLUTION RECORDERS
BROWN INSTRUMENT CO. ("Brown"), Philadelphia, Pa...*p. 292*
*FOXBORO CO. (Inc.), Foxboro, Mass... *p. 293*

RICE MILLING MACHINERY
Squier, Geo. L. Mfg. Co., Buffalo, N. Y.

RIFLING MACHINES
PRATT & WHITNEY CO., 111 Broadway, New York, N. Y...*p. 471*

RINGS
—Cable
Cameron Appliance Co. ("Cameron"), Everett, Mass.

—Welded
Akron-Selle Co., Akron, Ohio

—Weldless
Edgwater Steel Co., Farmers Bank Bldg., Pittsburgh, Pa.
Camden Forge Co., Mt. Ephraim Ave., Camden, N. J.
Cann & Saul Steel Co., 516 Commerce St., Philadelphia, Pa
Electric Steel & Forge Co., 6607 Grant Ave., Cleveland, Ohio
Ohio Forge Co., 2955 E. 92nd St., Cleveland, Ohio
VULCAN STEAM FORGING CO., 247 Rano St., Buffalo, N. Y...*p. 433*
WILLIAMS, J. H. & CO., 70 Richards St., Brooklyn, N. Y...*p. 517*

RIVET AND BOLT HEADING MACHINES
Ajax Mfg. Co., 3830 Lakeside Ave., Cleveland, Ohio

RIVET MAKING MACHINERY
Kent Machine Co., Kent, Ohio

RIVET SETS
CHICAGO PNEUMATIC TOOL CO. ("Boyer"),. 6 E. 44th St., New York, N. Y...*p. 548*
Cleveland Steel Tool Co., 660 E. 82nd St., Cleveland, Ohio
*INGERSOLL-RAND CO., 11 Broadway, New York, N. Y...*p. 546, 547*
Maddaus Tool Corpn., 90 West St., New York, N. Y.
MARCHANT, GEO. F. CO., 1420-28 S. Rockwell St., Chicago, Ill...*p. 505*
Rich Tool Co., 513 Railway Exchange, Chicago, Ill.
WILLIAMS, J. H. & CO., 70 Richards St., Brooklyn, N. Y...*p. 517*

RIVETERS
—Compression
Baird Pneumatic Tool Co., Rialto Bldg., Kansas City, Mo.

—Electric
Winfield Electric Welding Machine Co., 12 Atlantic St., Warren, Ohio

—Hydraulic
Chambersburg Engineering Co., Chambersburg, Pa.
WATSON-STILLMAN CO., 35 Church St., New York, N. Y...*p. 496*
WOOD, R. D. & CO., Philadelphia, Pa...*p. 597*

—Pinchbug
Baird Pneumatic Tool Co., Rialto Bldg., Kansas City, Mo.

—Pneumatic
Allen, John F. Co., 370 Gerard Ave., New York, N. Y.
Baird Pneumatic Tool Co., Rialto Bldg., Kansas City, Mo.
CHICAGO PNEUMATIC TOOL CO., 6 E. 44th St., New York, N. Y...*p. 548*
Dayton Pneumatic Tool Co., Dayton, Ohio
Grant Mfg. & Machine Co. ("Grant"), 90 Silliman Ave., Bridgeport, Conn.
Hanna Engineering Works ("Hanna"), 1765 Elston Ave., Chicago, Ill.
*INGERSOLL-RAND CO. ("Little David"), 11 Broadway, New York, N. Y...*pp. 546, 547*
Oldham, George & Son Co., 4316-22 Lackawanna St., Frankford, Philadelphia, Pa.

—Spinning
Grant Mfg. & Machine Co., 90 Silliman Ave., Bridgeport, Conn.

—Vibrating
Grant Mfg. & Machine Co. ("Grant"), 90 Silliman Ave., Bridgeport, Conn.

RIVETERS AND PUNCHES (Combined)
BERTSCH & CO., Cambridge City, Ind... *p. 442*

RIVETING MACHINES
BERTSCH & CO., Cambridge City, Ind...*p. 442*
High Speed Hammer Co. (Inc.), 313 Norton St., Rochester, N. Y.
Shuster, F. B. Co., New Haven, Conn.
Smith, F. H. Mfg. Co., 3037-3047 Carroll Ave., Chicago, Ill.
Titan Automatic Tool Co., 25 W. Broadway, New York, N. Y.
Townsend, H. P. Mfg. Co., Hartford, Conn.

—Electric
Eveland Electric Riveter Co., West End Trust Bldg., Philadelphia, Pa.

RIVETS
American Lock-Nut Co., 122 S. Michigan Ave., Chicago, Ill.
Bridgeport Screw Co., P. O. Box 1014, Bridgeport, Conn.
CHAMPION RIVET CO. ("Victor"), Cleveland, Ohio...*p. 521*
COLUMBUS BOLT WORKS CO., Columbus, Ohio...*p. 522*
Falls Rivet Co., Kent, Ohio
Garland Mfg. Co., Lawrence Co., West Pittsburgh, Pa.
Lamson & Sessions Co., Cleveland, Ohio
Pittsburgh Screw & Bolt Co., Preble Ave., Pittsburgh, Pa.
Progressive Mfg. Co., Torrington, Conn.
*REED & PRINCE MFG. CO., Worcester, Mass...*p. 524*
RUSSELL, BURDSALL & WARD BOLT & NUT CO. (Empire), Port Chester, N. Y... *p. 525*

—Boiler and Tank
CHAMPION RIVET CO. ("Victor"), Cleveland, Ohio...*p. 521*
Severence Mfg. Co., Glassport, Pa.

—Brass & Copper
Hungerford, U. T. Brass & Copper Co., 80 Lafayette St., New York, N. Y.

Digitized by Google

—Ship
CHAMPION RIVET CO. (''Victor''), Cleveland, Ohio...*p. 521*
Severance Mfg. Co., Glassport, Pa.

—Structural Steel
Bayonne Bolt & Nut Co., Bayonne, N. J.
CHAMPION RIVET CO., Cleveland, Ohio...*p. 521*
COLUMBUS BOLT WORKS CO., Columbus, Ohio...*p. 522*
National Bolt & Nut Co., 62nd St. & A. V. R. R., Pittsburgh, Pa.
Oliver Iron & Steel Co., So. 10th & Muriel Sts., Pittsburgh, Pa.
Severance Mfg. Co., Glassport, Pa.

—Tinners
American Lock-Nut Co., 122 S. Michigan Ave., Chicago, Ill.

ROAD MAKING MACHINERY
Barber Asphalt Paving Co., 1900 Land Title Bldg., Philadelphia, Pa.
CONNERY & CO. (Inc.), 2nd & Luzerne Sts., Philadelphia, Pa...*p. 651*
Cummer, F. D. & Son Co., 1152 Hanna Bldg., Cleveland, Ohio
Galion Iron Works & Mfg. Co., Galion, Ohio
Good Roads Machinery Co., Bulletin Bldg., Philadelphia, Pa.
HONHORST, JOS. CO., 1016-20 W. 6th St., Cincinnati, Ohio...*p. 654*
*INGERSOLL-RAND CO., 11 Broadway, New York, N. Y...*pp. 546, 547*
Universal Road Machinery Co., Kingston, N. Y.
WELLER MFG. CO., 1820-1856 N. Kostner Ave., Chicago, Ill...*p. 381*

ROAD MATERIAL TESTING MACHINES
RIEHLE BROS. TESTING MACHINE CO., 1424 N. 9th St., Philadelphia, Pa...*p. 208*

ROAD ROLLERS
Russell & Co., 814 S. Erie St., Massillon, O.

ROCK CRYSTAL
Diamond Drill Carbon Co., 61 Park Row, New York, N. Y.

ROD POINTING MACHINES
Torrington Co., Torrington, Conn.

RODS

—Bakelite
*CONTINENTAL FIBRE CO. (''Bakelite-Dilecto''), Newark, Del...*p. 418*

—Brass and Copper
AMERICAN BRASS CO., Waterbury, Conn...*p. 414*
Bridgeport Brass Co., Bridgeport, Conn.
Bristol Brass Co., Bristol, Conn.
Hungerford, U. T. Brass & Copper Co., 80 Lafayette St., New York, N. Y.
Taunton-New Bedford Copper Co., Taunton, Mass.
MUELLER METALS CO., Port Huron, Mich...*p. 428*

—Bronze
AMERICAN BRASS CO., Waterbury, Conn...*p. 414*
AMERICAN MANGANESE BRONZ CO., Holmesburg, Philadelphia, Pa...*p. 415*
MUELLER METALS CO., Port Huron, Mich. *p. 428*

—Conduit
DIAMOND EXPANSION BOLT (''Empire & Diamond'') 90 West St., Cor. Cedar, New York, N. Y...*p. 526*

—Drill
Hobson, Houghton & Co., (Ltd.), 83 Beekman St., New York, N. Y.
Kidd Drawn Steel Co., Aliquippa, Pa.
Lancaster Steel Products Co., Lancaster, Pa.
Pittsburgh Tool Steel Wire Co., Monaca, Pa.
Wheelock, Lovejoy & Co., 128 Sidney St., Cambridge, Mass.

—Fibre
AMERICAN VULCANIZED FIBRE CO., Wilmington, Del...*p. 417*
*CONTINENTAL FIBRE CO., Newark, Del...*p. 418*
DELAWARE HARD FIBRE CO., (Ltd.). (''D. H. Egyptian'') Wilmington, Del...*p. 419*
DIAMOND STATE FIBRE CO., (''Condensite Celoron''), Bridgeport, Pa...*p. 420*

—Nickel Silver
AMERICAN BRASS CO., Waterbury, Conn...*p. 414*

—Piston
AMERICAN BRASS CO., (''Tobin Bronze'') Waterbury, Conn...*p. 414*
Camden Forge Co., Mt. Ephraim Ave., Camden, N. J.

—Tie
Bayonne Bolt & Nut Co., Bayonne, N. J.

—Upset
Pittsburgh Screw & Bolt Co., Preble Ave., Pittsburgh, Pa.

—Welding
Gale Mfg. Co., Albion. Mich.
Metals Welding Co., 4400 Perkins Ave., Cleveland, Ohio
QUASI-ARC WELDTRODE CO., (Inc.), 114 Hudson Ave., Peekskill, N. Y...*p. 538*
WILSON WELDER & METALS CO., (Inc.), 259 36th St., Brooklyn. N. Y...*p. 537*

ROLL GRINDING
STURTEVANT MILL CO., Harrison Sq., Boston, 22, Mass...*pp. 600, 601*

ROLLER BEARINGS
(See Bearings. Roller)

ROLLERS (Conveying)
Main Belting Co., 917 South 13th St., Philadelphia, Pa.

ROLLING MILL MACHINERY
Abramsen Engineering Co., Union Bank Bldg., Pittsburgh, Pa.
BERTSCH & CO., Cambridge, Ind...*p. 442*
Alliance Machine Co., Alliance, Ohio
Birdsboro Steel Foundry & Machine Co., Birdsboro. Pa.
Birmingham Iron Foundry, Derby, Conn.
Carroll Foundry & Machine Co., Bucyrus, Ohio
Centre Foundry & Machine Co., Wheeling, W. Va.
Cleveland Machine & Mfg. Co., 406 National City Bldg., Cleveland, Ohio
Elyria Machine Co., Elyria. Ohio
Farrel Foundry & Mach. Co., Ansonia, Conn.
Federal Engineering Co., 588 Drexel Bldg., Philadelphia, Pa.
Garrison, A. Foundry Co., South 9th & Bingham St. S. S.. Pittsburgh, Pa.
Hyde Park Foundry & Machine Co., Hyde Park, Pa.
Mackintosh-Hemphill & Co., 12th & Etna Sts., Pittsburgh, Pa.
Mesta Machine Co., Box 1124, Pittsburgh, Pa.
Morgan Construction Co., Worcester, Mass.
Morgan Engineering Co., Alliance, Ohio
Newbold, R. S. & Son Co., Norristown, Pa.
Philadelphia Roll & Machine Co., 23rd St. & Washington Ave., Philadelphia, Pa.
POOLE, ENGINEERING & MACHINE CO., Woodberry, Baltimore, Md...*pp. 316, 317*
Richard Manufacturing Co., Bloomsburg, Pa.
Standard Engineering Co., Ellwood City, Pa.
Standard Machinery Co., Auburn, R. I.

Ro

Digitized by Google

ROLLING MILL MACHINERY (Continued)
TORRINGTON MFG. CO., Torrington, Conn. ..*p. 641*
Treadwell Eng. Co., 140 Cedar St., New York, N. Y.
United Engineering & Foundry Co., Farmers Bank Bldg., Pittsburgh, Pa.
Waterbury Farrel Foundry & Machine Co., 465 Bank St., Waterbury, Conn.
Wheeling Mold & Foundry Co., Farmers' Bank Bldg., Pittsburgh, Pa.
Wheeling Mold & Foundry Co., Wheeling, W. Va.
Woodard Machine Co., Wooster, Ohio
Youngstown Foundry & Machine Co., Youngstown, Ohio

ROLLING MILL WORK
Hardie-Tynes Mfg. Co., 8th Ave. & 28th St., Birmingham, Ala.

ROLLING PARTITIONS
(See Partitions, Rolling)

ROLLS

—Bending
Badger State Machine Co., Janesville, Wis.
BERTSCH & CO., Cambridge City, Ind...*p. 442*
Buffalo Forge Co., 490 Broadway, Buffalo, N. Y.
Camden Forge Co., Mt. Ephraim Ave., Camden, N. J.
Hendley & Whittemore Co., Beloit, Wis.
Kling Bros. Engineering Works, 1800 N. Kostner Ave., Chicago, Ill.
New Doty Mfg. Co., Janesville, Wis.
NIAGARA MACHINE & TOOL WORKS, Buffalo, N. Y...*p. 443*
NILES-BEMENT-POND CO., 111 Broadway, New York, N. Y...*p. 470*
Perkins Machine Co., Warren, Mass.
Rock River Machine Co., Janesville, Wis.

—Bending (Power Driven)
Southwark Foundry & Machine Co., 400 Washington Ave., Philadelphia, Pa.

—Bronze
AMERICAN MANGANESE BRONZE CO., Holmesburg, Philadelphia, Pa...*p. 415*

—Calender
KELLER MECHANICAL ENGRAVING CO., 68 Washington St., Brooklyn, N. Y...*p. 493*
POOLE ENGINEERING & MACHINE CO., Woodbury, Baltimore, Md...*pp. 316, 317*

—Calendar (Paper, Cotton, Etc.)
KELLER MECHANICAL ENGRAVING CO., 68 Washington St., Brooklyn, N. Y...*p. 493*
Lobdell Car Wheel Co., P. O. Box 965, Wilmington, Del.
PERKINS, B. F. & SON (Inc.), ("Schreiner"), Holyoke, Mass...*p. 558*

—Crushing
*ALLIS-CHALMERS MFG. CO., Milwaukee, Wis...*pp. 28, 29*
BARTLETT, C. O. & SNOW CO., Cleveland, Ohio..*p. 367*
Buchanan, C. G. Co., (Inc.), 90 West St., New York, N. Y.
BUCKEYE IRON & BRASS WORKS, Dayton, Ohio...*p. 168*
*FULLER-LEHIGH CO., Fullerton, Pa...*p. 128*
Pittsburgh Iron & Steel Fndries Co., ("Admite"), 314 Oliver Bldg., Pittsburgh, Pa.
STURTEVANT MILL CO., Harrison Sq., Boston 22, Mass...*pp. 600, 601*
*WORTHINGTON PUMP & MACHINERY CORP'N, 115 Broadway, New York, N. Y. ..*pp. 44, 45, 56, 47*

—Forging
Ajax Mfg. Co., 3830 Lakeside Ave., Cleveland, Ohio
Pennsylvania Forge Co., Bridesburg, Philadelphia, Pa.

—Galvanizing
*AMERICAN FORGE & MACHINE CO., Canton, Ohio..*pp. 430, 431*

—Iron
Standard Engineering Co., Ellwood City, Pa

—Rubber
GOODRICH, B. F. RUBBER CO., Akron, Ohio..*pp. 258, 259*
HOGGSON & PETTIS MFG. CO., New Haven, Conn...*pp. 512, 513, 514*

—Rubber Working
Lobdell Car Wheel Co., P. O. Box 965, Wilmington, Del.

—Scrap, Reclaiming
Ajax Manufacturing Co., 3830 Lakeside Ave., Cleveland, Ohio

—Steel
Ball & Roller Bearing Co., Danbury, Conn.
Birmingham Iron Foundry, Derby, Conn.
Farrel Foundry & Machine Co., Ansonia, Conn.
Garrison, A. Foundry Co., South 9th & Birmingham Sts. S. S., Pittsburgh, Pa.
Hubbard Steel Foundry Co., Railroad Ave., East Chicago, Ind.
Hyde Park Foundry & Machine Co., Hyde Park, Pa.
Mackintosh, Hemphill & Co., Pittsburgh, Pa.
Philadelphia Roll & Machine Co., 23rd St. & Washington Ave., Philadelphia, Pa.
Pittsburgh Iron & Steel Foundries Co., 314 Oliver Bldg., Pittsburgh, Pa.
Pittsburgh Roll Corp'n, Pittsburgh, Pa.
United Engineering & Foundry Co., Farmers' Bank Bldg., Pittsburgh, Pa.
Wheeling Mold & Foundry Co., Wheeling, W. Va.
Youngstown Foundry & Machine Co., Youngstown, Ohio

—Straightening
BERTSCH & CO., Cambridge City, Ind...*p. 442*
Camden Forge Co., Mt. Ephraim Ave., Camden, N. J.
New Doty Mfg. Co., Janesville, Wis.
NILES-BEMENT-POND CO., 111 Broadway, New York, N. Y...*p. 470*
TORRINGTON MFG. CO., Torrington, Conn. ..*p. 641*

—Tinning
*AMERICAN FORGE & MACHINE CO., Canton, Ohio..*pp. 430, 431*

—Wood
Hunt, Rodney Machine Co., Orange, Mass.

ROOFERS' SUPPLIES
HONHORST, JOS. CO., 1016-20 W. 6th St., Cincinnati, Ohio..*p. 654*

ROOFING

—Asphalt
Barber Asphalt Paving Co., Land Title Bldg., Philadelphia, Pa.

—Built-up
Barrett Co., 40 Rector St., New York, N. Y.

—Metal
Berger Mfg. Co., ("Berlor"), Canton, Ohio
Penn Metal Co., ("Penco"), 65 Franklin St., Boston, Mass.

—Prepared
Barrett Co., 40 Rector St., New York, N. Y.
CAREY, PHILIP CO., Cincinnati, Ohio..*p. 245*
Sall Mountain Co., 230 S. LaSalle St., Chicago, Ill.

Digitized by Google

ROPE

—Cotton

Lambeth Rope Corp'n, New Belford, Mass.

—Hoisting

*HUNT, C. W. CO., (Inc.), ("Stevedore"), West New Brighton, Staten Island, N. Y. *pp. 374, 375*

Plymouth Cordage Co., North Plymouth, Mass.

*ROEBLING'S, JOHN A., SONS CO., Trenton, N. J...*p. 409*

—Manila

American Mfg. Co., Noble & West Sts., Brooklyn, N. Y.

Columbian Rope Co., Auburn, N. Y.

*FALLS CLUTCH & MACHINERY CO., Cuyahoga Falls, Ohio..*p. 330*

Fischer & Hayes Rope & Steel Co., 741-745 W. Van Buren St., Chicago, Ill.

HUNT, C. W. CO., (Inc.), ("Stevedore"), West New Brighton, Staten Island, N. Y. *pp. 374, 375*

Plymouth Cordage Co., North Plymouth, Mass.

Wall Rope Works of New York, 48 South St., New York, N. Y.

Waterbury Co., 63 Park Row, New York, N. Y.

WELLER MFG. CO., 1820-1856 N. Kostner Ave., Chicago, Ill...*p. 381*

—Transmission

American Mfg. Co., Noble & West Sts., Brooklyn, N. Y.

*CALDWELL, H. W. & SON CO., 17th St. & Western Ave., Chicago, Ill...*p. 370*

Columbian Rope Co., Auburn, N. Y.

DODGE SALES & ENGINEERING CO., Mishawaka, Ind...*pp. 42, 43, 326, 327, 328, 329*

Durable Wire Rope Co., ("Jupiter"), 95 Pearl St., Boston, Mass.

*HILL CLUTCH CO., Cleveland, Ohio...*p. 331*

*HUNT, C. W. CO. (Inc.), ("Stevedore"), West New Brighton, Staten Island, N. Y. *pp. 374, 375*

Lambeth Rope Corp'n, New Bedford, Mass.

Plymouth Cordage Co., North Plymouth, Mass.

*ROEBLING'S, JOHN A., SONS CO., Trenton, N. J...*p. 409*

Wall Rope Works of New York, 48 South St., New York, N. Y.

Waterbury Co., 63 Park Row, New York, N. Y.

WELLER MFG CO., 1820-1856 N. Kostner Ave., Chicago, Ill...*p. 381*

—Wire

AMERICAN HOIST & DERRICK CO., St. Paul, Minn...*p. 383*

American Steel & Wire Co., 72 W. Adams St., Chicago, Ill.

Broderick & Bascom Rope Co. 76 Warren St., New York, N. Y.

Durable Wire Rope Co., ("Durable"), 95 Pearl St., Boston, Mass.

Fischer & Hayes Rope & Steel Co., 741-745 W. Van Buren St., Chicago, Ill.

Hazard Mfg. Co., Wilkes-Barre, Pa.

Leschen, A. & Sons Rope Co., St. Louis, Mo.

Macwhyte Co., Kenosha, Wis.

Moon, George C. Co., (Inc.), Garwood, N. J.

*ROEBLING'S, JOHN A., SONS CO., Trenton, N. J...*p. 409*

Rogers Wire Works, (Inc.), 291 Broadway, New York, N. Y.

Waterbury, Co., 63 Park Row, New York, N. Y.

Wickwire Spencer Steel Corp'n, Worcester, Mass.

Williamsport Wire Rope Co., Williamsport, Pa.

ROPE DRESSING

BASS FOUNDRY & MACHINE CO., Fort Wayne, Ind...*p. 57*

Cling-Surface Co., 1048 Niagara St., Buffalo, N. Y.

COOK'S, ADAM, SONS, 708-710 Washington St., New York, N. Y...*p. 251*

DODGE SALES & ENGINEERING CO., Mishawaka, Ind...*pp. 42, 43, 326, 327, 328, 329*

Durable Wire Rope Co., ("Durable"), 95 Pearl St., Boston, Mass.

Ironsides Co., Columbus, Ohio

Stephenson Mfg. Co., P. O. Box 380, Albany, N. Y.

ROPE DRIVES

*BROWN, A. & F. CO., 79 Barclay St., New York, N. Y...*p. 303*

*CALDWELL, H. W. & SON CO., 17th St. & Western Ave., Chicago, Ill...*p. 370*

DODGE SALES & ENGINEERING CO., Mishawaka, Ind...*pp. 42, 43, 326, 327, 328, 329*

*FALLS CLUTCH & MACHINERY CO., Cuyahoga Falls, Ohio..*p. 330*

*HILL CLUTCH CO., Cleveland, Ohio..*p. 331*

*MEDART PATENT PULLEY CO., St. Louis, Mo...*p. 333*

WELLER MFG. CO., 1820-56 N. Kostner Ave., Chicago, Ill...*p. 381*

*WOOD'S, T. B., SONS CO., Chambersburg, Pa...*pp. 334, 335*

ROPE MAKING MACHINERY

Haskell-Dawes Machine Co., Erie & Trenton Aves., Philadelphia, Pa.

ROUTING MACHINES

ROYLE, JOHN & SONS, Paterson, N. J. *p. 643*

RUBBER GOODS

—Hard

American Hard Rubber Co., 11 Mercer St., New York, N. Y.

GOODRICH, B. F. RUBBER CO., Akron, Ohio..*pp. 258, 259*

*JOHNS-MANVILLE, INC., New York, N. Y. *p. 244*

Stokes, Jos. Rubber Co., Trenton, N. Y.

—Mechanical

Anchor Packing Co., 7th & Filbert Sts., Philadelphia, Pa.

Boston Woven Hose & Rubber Co., Cambridge, Mass.

Cancos Mfg. Co., Bridge & Garden Sts., Bridesburg, Philadelphia, Pa.

Cincinnati Rubber Mfg. Co., Cincinnati, Ohio

Consolidated Rubber Co., P. O. Box 86, Trenton, N. J.

Continental Rubber Works, 19th & Liberty Sts., Erie, Pa.

"Double Service" Packing Co., 246 Chestnut St., Philadelphia, Pa.

GOODRICH, B. F. RUBBER CO., Akron, Ohio..*pp. 258, 259*

Goshen Rubber & Mfg. Co., Goshen, Ind.

Hamilton Rubber Mfg. Co., Trenton, N. J.

*JENKINS BROS., 80 White St., New York, N. Y...*pp. 180, 181*

*JOHNS-MANVILLE, (Inc.), New York, N. Y...*p. 244*

Knowlton, Geo. W. Rubber Co., 60 Pearl St., Boston, Mass.

NEW YORK RUBBER CO., 34 Reade St., New York, N. Y...*pp. 260, 261*

Pioneer Rubber Mills, 68 Sacremento St., San Francisco, Cal

Quabang Rubber Co., North Brookfield, Mass.

Quaker City Rubber Co., 629 Market St., Philadelphia, Pa.

Digitized by Google

RUBBER GOODS (Continued)
Republic Rubber Company, Youngstown, Ohio
Salisbury, W. H. & Co., 308-310 W. Madison St., Chicago, Ill.
Thermoid Rubber Co., Trenton, N. J.

RUBBER MILL MACHINERY
Allen Machine Co., Erie, Pa.
American Process Co., 68 William St.. New York, N. Y.
BIGGS BOILER WORKS CO., Case Ave. & Newton St.. Akron, Ohio..*p. 650*
Birmingham Iron Foundry. Derby, Conn.
Cutter. Geo. A., Taunton, Mass.
Elyria Machine Co., Elyria, Ohio
Farrel Fndry. & Machine Co., Ansonia, Conn.
Goshen Rubber & Mfg. Co., Goshen, Ind.
Hintz Mfg. Co.. 1100-1110 So. Kilbourn Ave., Chicago, Ill.
Reynolds Machine Co, N. West St., Massillon, Ohio
Vaughn Machinery Co., Cuyahoga Falls, Ohio

RUBBER TESTING MACHINES
OLSEN, TINIUS TESTING MACHINE CO., 500 N. 12th St., Philadelphia, Pa...*pp. 265, 266, 267*
RIEHLE BROS. TESTING MACHINE CO., 1424 N. 9th St., Philadelphia, Pa...*p. 268*
Shore Instrument & Mfg. Co. (''Durometer'') 9025-9029 Van Wyck Ave., Jamaica, N. Y.
*WESTINGHOUSE ELECTRIC & MFG. CO., East Pittsburgh, Pa...*pp. 160, 161*

RUBBER TIRE MACHINERY
Dexter, I. H. Co., Goshen, N. Y.

RUBBER TUBING MACHINES
ROYLE, JOHN & SONS, Paterson, N. J. *p. 643*

RUST-PROOFING
Globe Mach. & Stamping Co., 1254 W. 76th St., Cleveland, Ohio
Parker Rust Proof Co. of America, 645 Milwaukee Ave. E.. Detroit, Mich.

Sa

S

SACCHAROMETERS
TAGLIABUE, C. J. MFG. CO., 18-88 83rd St., Brooklyn, N. Y...*p. 296*
Wagner, Carl H., 1944 W. Albany Ave., Chicago, Ill.

SAFETY DEVICES

—Elevator Door
Elevator Supplies Co. (Inc.), 1515 Willow Ave., Hoboken, N. J.
Watson Elevator Co., 407 W. 36th St., New York, N Y.

—Grindstone Hood
NEWBURGH STEAM BOILER WORKS, (P. Delany & Co.), Newburgh, N. Y...*p. 64*

—Latches for Boiler Doors
DeWater Safety Latch Co. (Inc.), Far Rockaway, N. Y.

—Power Press
GEUDER, PAESCHKE & FREY CO., Western Valley, Milwaukee, Wis...*p. 434*
Taylor-Shantz Co., 478-486 St. Paul St., Rochester, N. Y.
Walsh Press & Die Co., 4709 W. Kinzie St., Chicago, Ill.

SALT MAKING MACHINERY
*WILCOX ENGINEERING CO., Saginaw, Mich...*pp. 272, 613*

SAMPLING MACHINERY
STURTEVANT MILL CO., Harrison Sq., Boston 22, Mass...*pp. 600, 601*

SAND BLAST APPARATUS
American Foundry Equipment Co., 366 Madson Ave., New York, N. Y.
Hoevel Mfg. Corp'n, 154 Ogden Ave., Jersey City, N. J.
Industrial Air Engineering Co., 310-311 Perry Payne Bldg., Cleveland, Ohio
*LUNKENHEIMER CO., Cincinnati, Ohio *pp. 184, 185, 186, 187, 188, 189*
Mac Leod Co., 2232 Bogen St., Cincinnati, Ohio
New Haven Sand Blast Co., New Haven, Conn.
*PANGBORN CORP'N, P. O. Box 859, Hagerstown, Md...*pp. 636, 637*
Paxson, J. W. Co., 1021 N. Delaware Ave., Philadelphia, Pa.
Ruemelin Mfg. Co., Stillwater, Minn.
Sly, W. W. Mfg. Co., Cleveland, Ohio
Tilghman-Brooksbank Sand Blast Co., 1126 S. Eleventh St., Philadelphia, Pa.

SAND-BLAST CABINETS
*PANGBORN CORP'N, Hagerstown, Pa...*pp. 636, 637*

SAND BLAST ROOMS
Hoevel Mfg. Corp'n, 154 Ogden Ave., Jersey City, N. J.
*PANGBORN CORP'N, P. O. Box 859, Hagerstown, Md...*pp. 636, 637*
Tilghman-Brooksbank Sand Blast Co., 1126 S. Eleventh St., Philadelphia, Pa.

SAND BLAST TABLES
*PANGBORN CORP'N, P. O. Box 859, Hagerstown, Md...*pp. 636, 637*
Ruemelin Mfg. Co., Stillwater, Minn.

SAND CUTTING MACHINERY
American Foundry Equipment Co., 366 Madison Ave., New York, N. Y.
Sand Mixing Machine Co., 52 Vanderbilt Ave., New York, N. Y.

SAND WASHING MACHINES
Phillips & McLaren Co., 24th & Smallman Sts., Pittsburgh, Pa.

SANDERS, LOCOMOTIVE
*UNITED STATES METALLIC PACKING CO., 429 N. 13th St., Philadelphia, Pa..;*p. 257*

SANDPAPER
Manning Abrasive Co. (Inc.), Troy, N. Y.

SASH, STEEL
Bayley, William Co., Springfield, Ohio
Detroit Steel Products Co. (''Fenestra''), 2250 E. Grand Blvd., Detroit, Mich.
Lupton's, David Sons Co., Allegheny Ave. & Tulip St., Philadelphia, Pa.
Thorn, J. S. Co., 20th St. & Allegheny Ave., Philadelphia, Pa.

SASH OPERATING DEVICES
Bayley, William Co.. Springfield, Ohio
Dee, William V., Co., 168-170 Wade St., Bridgeport, Conn.
Detroit Steel Products Co., 2250 E. Grand Blvd., Detroit, Mich.
Drouve, G. Co., Bridgeport, Conn.
Hitchings & Co., Elizabeth, N. J.
Payson Manufacturing Co., 2920 W. Jackson Blvd., Chicago, Ill.

SAW MILL MACHINERY
*ALLIS-CHALMERS MFG. CO., Milwaukee, Wis...*pp. 28, 29*
Beach Mfg. Co., Montrose, Pa.
Bolinders Co., 30 Church St., New York, N. Y.
Bretting, C. G. Mfg. Co., Ashland, Wis.
Chase Turbine Mfg. Co., Orange, Mass.
Clark Bros. Co., Olean, N. Y.
Corinth Machinery Co., Corinth, Miss.
Enterprise Co., Columbiana, Ohio
Fay, J. A. & Eagen Co., Cincinnati, Ohio
Filer & Stowell Co., Milwaukee, Wis.
Garland, M. Co., Bay City, Mich.

Digitized by Google

JEFFREY MFG. CO., 904 N. 4th St., Columbus, Ohio...*pp. 376, 377*
Lane Mfg. Co., Montpelier, Vt.
Liddell Co., Charlotte. N. C.
McDonough Mfg. Co., Eau Claire, Wis.
Phoenix Mfg. Co., Eau Claire, Wis.
PRESCOTT CO., Menominee, Mich...*p. 580*
Sinker Davis Co., 230 S. Missouri St., Indianapolis, Ind.
Soule Steam Feed Works, Meridan, Miss.
Union Iron Works, Bangor, Maine
Whitney, Baxter D. & Son (Inc.), Winchendon, Mass.
Wood, S. A. Machine Co., Boston 27, Mass.

SAW MILLS (Portable)
Farquhar, A. B. Co. (Ltd.), York, Pa.

SAW RIGS (Portable)
*NOVO ENGINE CO., Lansing, Mich...*pp. 586, 587*
Witte Engine Works, 16th & Oakland Ave., Kansas City, Mo.
Knickerbocker Co., Jackson, Mich.

SAW SHARPENING MACHINES
ATKINS, E. C. & CO. (Inc.), Indianapolis, Ind...*p. 506*
NILES-BEMENT-POND CO., 111 Broadway, New York, N. Y...*p. 470*
The Wardwell Mfg. Co., 110-112 Hamilton Ave., Cleveland, Ohio

SAWING MACHINES (Circular)
Greenlee Bros. & Co., Rockford, Ill.

SAWS

—Band
American Saw & Manufacturing Co., Springfield, Mass.
Armstrong-Blum Mfg. Co., 333-357 N. Francisco Ave., Chicago, Ill.
ATKINS, E. C. & CO. (Inc.), Indianapolis, Ind...*p. 506*
Disston, Henry & Sons (Inc.), Philadelphia, Pa.
Huther Bros. Saw Mfg. Co., 1190 University Ave., Rochester, N. Y.
Quality Saw Co., 91 Hale St., Haverhill, Mass.
Shinn, M. E. & Co., 1846 W. Lake St., Chicago, Ill.
Thompson, Henry G. & Son Co., New Haven, Conn.
Yates, P. B. Machine Co., Beloit, Wis.

—Band (Metal Cutting)
American Saw & Mfg. Co., Springfield, Mass.
ATKINS, E. C. & CO. (Inc.), Indianapolis, Ind...*p. 506*
Metal Saw & Machine Co. (Inc.), 40 Napier St., Springfield, Mass.
West Haven Mfg. Co., New Haven, Conn.

—Circular (Metal)
ATKINS, E. C. & CO. (Inc.), Indianapolis, Ind...*p. 506*
Cowles Tool Co., 2086 W. 110th St., Cleveland, Ohio
Disston, Henry & Sons (Inc.), Philadelphia, Pa.
Dyett, Frank J. Co., 73 John St., Ilion, N. Y.
Espen-Lucas Machine Works, Front St. & Girard Ave., Philadelphia, Pa.
Hunter Saw & Machine Co., 57th & Butler Sts., Pittsburgh, Pa.
Huther Bros. Saw Mfg. Co., 1190 University Ave., Rochester, N. Y.
Lippert, E. T. Saw Co., Pittsburgh, Pa.
NATIONAL TOOL CO. (''National-Cleveland''), Cleveland, Ohio..*p. 504*
Ohlen-Bishop. (James Ohlen Plant), Columbus, Ohio
Quality Saw Co., 91 Hale St., Haverhill, Mass.
*SIMONDS MFG. CO., Fitchburg, Mass...*p. 507*
TORRINGTON MFG. CO., Torrington, Conn. *p. 641*

—Circular (Metal, Inserted Tooth)
ATKINS, E. C. & CO. (Inc.), Indianapolis, Ind...*p. 506*
Hoe, R. & Co., 504-520 Grand St., New York, N. Y.
Hunter Saw & Machine Co., 57th & Butler Sts., Pittsburgh, Pa.
Lippert, E. T. Saw Co., Pittsburgh, Pa.
NILES-BEMENT-POND CO., 111 Broadway, New York, N. Y...*p. 470*
*SIMONDS MFG. CO., Fitchburg, Mass. ..*p. 507*
Tabor Mfg. Co., 18th & Hamilton Sts., Philadelphia, Pa.

—Circular (Wood)
Lippert, E. T. Saw Co., Pittsburgh, Pa.
Yates, P. B. Machine Co., Beloit, Wis.

—Coping
Metal Saw & Machine Co. (Inc.), 40 Napier St., Springfield, Mass.

—Cross Cut
Ohlen-Bishop Co., (James Ohlen Plant), Columbus, Ohio

—Drag
Witte Engine Works, 16th & Oakland Ave., Kansas City, Mo.

—Grooving
ATKINS, E. C. & CO. (Inc.), Indianapolis, Ind...*p. 506*

—Hack (Power)
Armstrong-Blum Mfg. Co., 333-357 N. Francisco Ave., Chicago, Ill.
ATKINS, E. C. & CO. (Inc.), Indianapolis, Ind...*p. 506*
Myers Machine Tool Corp'n, Second & Chestnut Sts., Columbia, Pa.
NILES-BEMENT POND CO., 111 Broadway, New York, N. Y...*p. 470*
Peerless Machine Co., 1615 Racine St., Racine, Wis.
Racine Tool & Machine Co., Racine, Wis.
Robertson Machine & Foundry Co., 56-58. Rano St., Buffalo, N. Y.
*SIMONDS MFG. CO., Fitchburg, Mass...*p. 507*
*STARRETT, L. S. CO., Athol, Mass...*p. 508*
West Haven Mfg. Co., New Haven, Conn.

—Hack (Power, Automatic)
Armstrong-Blum Mfg. Co., 333-357 N. Francisco Ave., Chicago, Ill.
ATKINS, E. C. & CO. (Inc.), Indianapolis, Ind...*p. 506*
Thompson, Henry G. & Son Co., New Haven, Conn.

—Hand
Ohlen-Bishop Co (Geo. H. Bishop Plant), Lawrenceburg, Ind.

—Hot Metal
Ajax Mfg. Co., 3830 Lakeside Ave., Cleveland, Ohio

—Rip
ATKINS, E. C. & CO. (Inc.), Indianapolis, Ind...*p. 506*

—Swing (Electric)
Kaetker Saw Machine Co. (''Reliance''), 4610 Spring Grove Ave., Cincinnati, Ohio

SCALES

—Apportioning
RELIANCE WEIGHING MACHINE DIVISION, Stearns Motor Mfg. Co., Ludington, Mich...*p. 271*

Sc

Digitized by Google

SAWS (Continued)
—Automatic
American Kron Scale Co., 430 E. 53rd St., New York, N. Y.
Automatic Weighing Machine Co., 134-140 Commerce St., Newark, N. J.
Boston Scale & Machine Co., 100 Ruggles, Boston 20, Mass.
Buffalo Scale Co. (Inc.), 1200 Niagara St., Buffalo, N. Y.
Computing Scale Co., Dayton, Ohio
CONVEYING WEIGHER CO., 90 West St., New York, N. Y...*p. 371*
DU VIVIER, ERNEST H., 30 Church St., New York, N. Y...*p. 270*
FAIRBANKS CO., 416 Broome St., New York, N. Y...*pp. 174, 175*
FAIRBANKS, MORSE & CO., 900 S. Wabash Ave., Chicago, Ill...*p. 41*
Howe Scale Co. of N. Y. (The), 341 Broadway, New York, N. Y.
National Packaging Machinery Co., 174 Green St., Jamaica Plain, Boston, Mass.
RELIANCE WEIGHING MACHINE DIVISION, Stearns Motor Mfg. Co., Ludington, Mich...*p. 271*
Richardson Scale Co., Passaic, N. J.
Toledo Scale Co., Monroe & Albion Sts., Toledo, Ohio

—Beam
FAIRBANKS, MORSE & CO., 900 S. Wabash Ave., Chicago, Ill...*p. 41*

—Coal
DU VIVIER, ERNEST H., 30 Church St., New York, N. Y...*p. 270*
RELIANCE WEIGHING MACHINE DIVISION, Stearns Motor Mfg. Co., Ludington, Mich...*p. 271*

—Conveyor
Electric Weighing Co., 182 Thirteenth Ave., New York, N. Y.

—Counting
Toledo Scale Co., Monroe & Albion Sts., Toledo, Ohio

—Crane
Strait, H. N. Mfg. Co., Kansas City, Mo.

—Dormant
Buffalo Scale Co. (Inc.), 1200 Niagara St., Buffalo, N. Y.
FAIRBANKS, MORSE & CO., 900 S. Wabash Ave., Chicago, Ill...*p. 41*
Jones of Binghamton, (Inc.), Binghamton, N. Y.
Standard Scale & Supply Co. ("Standard"), 1631 Liberty Ave., Liberty, Pa.
Toledo Scale Co., Monroe & Albion Sts., Toledo, Ohio

—Fluid Materials
DU VIVIER, ERNEST H., 30 Church St., New York, N. Y...*p. 270*

Fluid Pressure
*CROSBY STEAM GAGE & VALVE CO., 40 Central St., Boston, Mass...*pp. 202, 208*

—Heavy Duty
Toledo Scale Co., Monroe & Albion Sts., Chicago, Ill.

—Hopper
American Kron Scale Co., 430 E. 53rd St., New York, N. Y.
Buffalo Scale Co. (Inc.), 1200 Niagara St., Buffalo, N. Y.
FAIRBANKS, MORSE & CO., 900 S. Wabash Ave., Chicago, Ill...*p. 41*
RELIANCE WEIGHING MACHINE DIVISION, Stearns Motor Mfg. Co., Ludington, Mich...*p. 271*
Toledo Scale Co., Monroe & Albion Sts., Toledo, Ohio

—Industrial Railway
Fairbanks, E. & T. & Co., St., Johnsbury, Vt.
HUNT, C. W. CO. (Inc.), West New Brighton, Staten Island, N. Y...*pp. 374, 375*

—Laboratory
Eimer & Amend, 205 3rd Ave., New York, N. Y.
Torsion Balance Co, 92 Reade St., New York, N. Y.

—Mine Tipple
Buffalo Scale Co. (Inc.), 1200 Niagara St., Buffalo, N. Y.

—Monorail
RELIANCE WEIGHING MACHINE DIVISION, Stearns Motor Mfg. Co., Ludington, Mich...*p. 271*
Toledo Scale Co., Monroe & Albion Sts., Toledo, Ohio

—Platform
Buffalo Scale Co. (Inc.), 1200 Niagara St., Buffalo, N. Y.
Chatillon, John & Sons, 85-93 Cliff St., New York, N. Y.
FAIRBANKS CO., 416 Broome St., New York, N. Y...*pp. 174, 175*
FAIRBANKS, MORSE & CO., 900 S. Wabash Ave., Chicago, Ill...*p. 41*
Jones of Binghamton (Inc.), Binghamton, N. Y.
Toledo Scale Co., Monroe & Albion Sts., Toledo, Ohio

—Railroad Track
Buffalo Scale Co. (Inc.), 1200 Niagara St., Buffalo, N. Y.
FAIRBANKS, MORSE & CO., 900 Wabash Ave., Chicago, Ill...*p. 41*
Howe Scale Co. of N. Y., 341 Broadway, New York, N. Y.
Standard Scale & Supply Co. ("Standard"), 1631 Liberty Ave., Pittsburgh, Pa.

—Sacking
RELIANCE WEIGHING MACHINE DIVISION, Stearns Motor Mfg. Co., Ludington, Mich...*p. 271*

—Special
Toledo Scale Co., Monroe & Albion Sts., Toledo, Ohio

—Tank
Toledo Scale Co., Monroe & Albion Sts., Chicago, Ill.

—Wagon
Buffalo Scale Co. (Inc.), 1200 Niagara St., Buffalo, N. Y.
FAIRBANKS, MORSE & CO., 900 S. Wabash Ave., Chicago, Ill...*p. 41*
Jones of Binghamton (Inc.), Binghamton, N. Y.

SCLEROSCOPES (Hardness Tester)
Holz & Co. (Inc.), 17 Madison Ave., New York, N. Y.
Shore Instrument & Mfg. Co., 9025-29 Van Wyck Ave., Jamaica, N. Y.

SCRAP METAL BUNDLERS
(See Bundlers, Scrap Metal)

SCRAPING MACHINES (Wood)
Anderson Bros. Mfg. Co., 1911 Kishwaukee St., Rockford, Ill.
Whitney, Baxter D. & Son (Inc.), Winchenden, Mass.

SCREENS
—Monel Metal Wire
Michigan Wire Cloth Co., 536 Howard St., Detroit, Mich.

—Perforated Metal
*ALLIS-CHALMERS MFG. CO., Milwaukee, Wis...*pp. 28, 29*

Digitized by Google

*CALDWELL, H. W. & SON CO., 17th St. & Western Ave., Chicago, Ill...*p. 370*
Erdle Perforating Co., 171 York St., Rochester, N. Y.
Harington & King Perforating Co., 629 N. Union Ave., Chicago, Ill.
*HENDRICK MFG. CO., ("Hendrick") Carbondale, Pa...*p. 653*
JEFFREY MFG. CO., 904 North 4th St., Columbus, Ohio..*pp. 376, 377*
Manhattan Perforated Metal Co., 237 Centre St., New York, N. Y.
Ulundt, Charles & Sons, 53-65 Fairmont Ave., Jersey City, N. J.
WELLER MFG. CO., 1820-1856 N. Kostner Ave., Chicago, Ill...*p. 381*

—Revolving
*ALLIS-CHALMERS MFG. CO., Milwaukee, Wis...*pp. 28, 29*
BARTLETT, C. O. & SNOW CO., Cleveland, Ohio..*p. 367*
*CALDWELL, H. W. & SON CO., 17th St. & Western Ave., Chicago, Ill...*p. 370*
Carthage Machine Co., Carthage, N. Y.
Chalmers & Williams, Chicago Heights, Ill.
*HENDRICK MFG. CO., Carbondale, Pa., p 653
JEFFREY MFG. CO., 904 N. 4th St., Columbus, Ohio..*pp. 376, 377*
McLanahan-Stone Machine Co., Hollidaysburg, Pa.
ROBINS CONVEYING BELT CO., Park Row, Bldg., New York, N. Y...*p. 373*
Universal Road Machinery Co., Kingston, N. Y.
Walker & Ellicott, Wilmington, Del.
WELLER MFG. CO., 1820-1856 N. Kostner Ave., Chicago, Ill...*p. 381*
WILLIAMS PATENT CRUSHER & PULVERIZER CO., St. Louis, Mo...*p. 602, 603*

—Shaking
Associated Engrg. Co., Somerset, Ky.
BARTLETT, C. O. & SNOW CO., Cleveland, Ohio..*p. 367*
*CALDWELL, H. W. & SON CO., 17th St. & Western Ave., Chicago, Ill...*p. 370*
Excavating & Screening Machinery Co., 743 Security Bldg., Minneapolis, Minn.
Fairmont Mining Machinery Co., Fairmont, W. Va.
Gay, Rubert M. Co., 114 Liberty St., New York, N. Y.
Gruendler Patent Crusher & Pulverizer Co., 928 N. First St., St. Louis Mo.
*HENDRICK MFG. CO., ("Hendrick") Carbondale, Pa...*p. 653*
HOLMES ROBT. & BROS. (INC.), Danville, Ill...*p. 386, 387*
JEFFREY MFG. CO., 904 N. 4th St., Columbus, Ohio..*pp. 376, 377*
ROBINS CONVEYING BELT CO., Park Row Bldg., New York, N. Y...*p. 373*
STURTEVANT MILL CO., Harrison Sq. Boston, Mass...*pp. 600, 601*
UNION ENGINEERING CO., Cleveland, Ohio *p. 645*
WELLER MFG. CO., 1820-1856 N. Kostner Ave., Chicago, Il...*p. 381*
WILLIAMS PATENT CRUSHER & PULVERIZER CO., St. Louis, Mo...*pp. 602, 603*

—Shaking (Clay)
Fernholtz Brick Machinery Co., 1446 S. Vandeventer Ave., St. Louis, Mo.

— Vibrating
JEFFREY MFG. CO., 904 N. 4th St., Columbus, Ohio..*pp. 376, 377*
National Engineering Co., 549 W. Washington Blvd., Chicago, Ill.
STURTEVANT MILL CO., Harrison Sq. Boston, Mass...*pp. 600, 601*

—Well
COOK, A. D. (Inc.), Lawrenceburg, Ind. *p. 585*

—Wire
BARTLETT, C. O. & SNOW CO., Cleveland, Ohio..*p. 367*
*CALDWELL, H. W. & SON CO., 17th St. & Western Ave., Chicago, Ill...*p. 370*
Michigan Wire Cloth Co., 536 Howard St., Detroit, Mich.
Newark Wire Cloth Co., 224 Verona Ave., Newark, N. J.

SCREW CUTTING DIES
(See Dies, Thread Cutting)

SCREW DRIVING MACHINES
Errington Mechanical Laboratory, Broadway & John St., New York, N. Y.
Reynolds Machine Co., N. West St., Massillon, Ohio

—Electric (Portable)
Neil & Smith Electric Tool Co., 813-815 Broadway, Cincinnati, Ohio

SCREW JACKS
(See Jacks, Screw)

SCREW MACHINE PRODUCTS
Atlas Brass Foundry Co., Columbus, Ohio
AUTOMATIC PRODUCTS CORP'N., 199-203 Eighth St., Long Island City, N. Y...*p. 518*
Babson-Dow Mfg. Co., 60 Fulda St., Roxbury, Boston, Mass.
BARNES, WALLACE CO., Bristol, Conn. *p. 519*
Belvidere Screw & Machine Co., Belvidere, Ill.
BLAKE & JOHNSTON CO., Waterbury, Conn...*p. 491*
Brown Bag Filling Machine Co., Fitchburg, Mass.
Chicago Automatic Machine Co., 400-408 N. Oakley Blvd., Chicago, Ill.
Chicago Screw Co., Fillmore & Homan Ave., Chicago, Ill.
Cincinnati Screw Co., Tightwee, Ohio (Cincinnati Suburb)
Corbin Screw Corp'n., New Britain, Conn.
Dallett, Thomas H. Co., Broad & Federal Sts., Philadelphia, Pa.
Defiance Screw Machine Products Co., 731 Perry St., Defiance, Ohio
Detroit Screw Works, Detroit, Mich.
Eastern Machine Screw Corp'n, New Haven, Conn.
E. C. Manufacturing Co., 546-548 W. Harrison St., Chicago, Ill.
Ferry Cap & Set Screw Co., 2151 Scranton Road, Cleveland, Ohio
Fosteria Screw Co., Fosteria, Ohio
Globe Machine & Stamping Co., 1254 W. 76th St., Cleveland, Ohio
Hanson Bros., Plainville, Conn.
Hill Pump Valve Co., Belmont & Knox Ave., Chicago, Ill.
Humason Mfg. Co., Forestville, Conn.
Michigan Screw Co., Lansing, Mich.
Miles, Franklin S., 205 Quarry St., Philadelphia, Pa.
Moore, Geo. W., 44 Farnsworth St., Boston, Mass.
MUELLER METALS CO., Port Huron, Mich...*p. 428*
NATIONAL ACME CO., ("Namco"), Cleveland, Ohio..*pp. 464, 465*
NEW BRITAIN MACHINE CO., New Britain, Conn...*p. 463*
New Haven Screw Co., 191-193 Foster St., New Haven, Conn.
Niagara Brass Mfg. Co., (Inc.), 163 Adams St., Buffalo, N. Y.
Peninsular Milled Screw Co., 1090 Lafayette E., Detroit, Mich.

Sc

Digitized by Google

SCREW MACHINE PRODUCTS (Continued)
Perry-Fay Co., Elyria, Ohio
*PRECISION INSTRUMENT CO., Newark, N. J...*pp. 284, 285*
Ramsdell Specialty Co., W. Boylston St., Worcester, Mass.
Sabin Machine Co., 6536 Carnegie Ave., Cleveland, Ohio
Selflock Nut & Bolt Co. (Inc.), East Syracuse, N. Y.
Sherman Clove Co., 4640 W. Harrison St., Chicago, Ill.
Shimer, Samuel J. & Sons., Milton, Pa.
Smith, F. H. Mfg. Co., 3037-3047 Carroll Ave, Chicago, Ill.
Standard Screw Products Co., Bellevue & Warren Ave., Detroit, Mich.
Standard Turnbuckle Co., Woolworth Bldg., New York, N. Y.
U. S. Automatic Co., Amherst, Ohio
Weiss, Louis T., 295 Taaffe Place, Brooklyn, N. Y.
Western Automatic Machine Screw Co., Elyria, Ohio
Wicaco Screw & Machine Works, (Inc.), N. E. cor. 7th & Wood St., Philadelphia, Pa.
Winchester Repeating Arms Co., New Haven, Conn.

SCREW MACHINES

—Automatic
BROWN & SHARPE MFG. CO., Providence, R. I...*p. 477*
Chicago Automatic Machine Co., 406-408 N. Oakley Blvd., Chicago, Ill.
CLEVELAND AUTOMATIC MACHINE CO., Cleveland, Ohio..*p. 462*
NATIONAL ACME CO., ("Acme & Gridley"), Cleveland, Ohio..*pp. 464, 465*

—Automatic, Multiple Spindle
Cincinnati Automatic Machine Co., ("Cincinnati"), Cincinnati, Ohio
Davenport Machine Tool Co., (Inc.), Rochester, N. Y.
NATIONAL ACME CO., Cleveland, Ohio ..*pp. 464, 465*
NEW BRITAIN MACHINE CO., New Britain, Conn...*p. 463*

—Hand
Acme Machine Tool Co., 4955 Spring Grove Ave., Cincinnati, Ohio
Bardons & Oliver, 1133 Ninth St., Cleveland, Ohio
BROWN & SHARPE MFG. CO., Providence, R. I...*p. 477*
Derses Machine Tool Co., 227 W. McMicken Ave., Cincinnati, Ohio
Foster Machine Co., W. Beardsley Ave., Elkhart, Ind.
Garvin Machine Co., Spring & Varick Sts., New York, N. Y.
HERCULES MACHINE & TOOL CO., INC., Broome & Lafayette Sts., New York, N. Y. *p. 476*
*JONES & LAMSON MACHINE CO., Springfield, Vt...*pp. 450, 451, 452, 453, 454*
MILLHOLLAND MACHINE CO., Indianapolis, Ind...*p. 455*
Smurr & Kamen Co., 328 N. Albany Ave., Chicago, Ill.
*WARNER & SWASEY CO., Cleveland, Ohio ..*pp. 456, 457*

—Semi-Automatic
Chicago Automatic Machine Co., 400 N. Oakley Boul., Chicago, Ill.
Smurr & Kamen Co., 32 N. Albany Ave., Chicago, Ill.
WOOD TURRET MACHINE CO., (Titled Turret), Brazil, Ind...*pp. 458, 459*

—Wire Feed
BROWN & SHARPE MFG. CO., Providence, R. I..*p. 477*

SCREW PLATES
American Tap & Die Co., Greenfield, Mass.
Bay State Tap & Die Co., Mansfield, Mass.
Butterfield & Co., Derby Line, Vt.
Card, S. W. Mfg. Co., Rumford Ave., Mansfield, Mass.
Conant & Donelson Co., ("Reliable"), Conway, Mass.
Greenfield Tap & Die Corp'n., ("Little Giant" "OK" "Lighting") Greenfield, Mass.
Oster Mfg. Co., 2057 E. 61st Place, Cleveland, Ohio
Russell Mfg. Co., Greenfield, Mass.
Winter Bros. Co., Wrentham, Mass.

SCREW SHELLS
Risdon Mfg. Co., Naugatuck, Conn.

SCREW STEEL
Fitzsimons Steel & Iron Co., 3549 S. Racine Ave., Chicago, Ill.

—Cold Drawn
Columbia Steel & Shafting Co., Pittsburgh, Pa.
New England Drawn Steel Co., Mansfield, Mass.
Standard Screw Products Co., Bellevue & Warren Ave., Detroit, Mich.
*UNION DRAWN STEEL CO., Beaver Falls, Pa...*p. 423*

SCREW THREAD COMPARATOR
*JONES & LAMSON MACHINE CO., Springfield, Vt...*pp. 450, 451, 452, 453, 454*

SCREW THREAD ROLLING MACHINES (Sheet Metal)
*BLISS, E. W. CO., Brooklyn, N. Y...*pp. 438, 439*

SCREWS

—Cap and Set
Allen Mfg. Co., 135 Sheldon St., Hartford, Conn.
AUTOMATIC PRODUCTS CORP'N., 99-203 Eighth St., Long Island City, N. Y...*p. 518*
Babson-Dow Mfg. Co., 60 Fulda St., Roxbury, Boston, Mass.
Chicago Screw Co., Fillmore & Homan Aves., Chicago, Ill.
Cincinnati Screw Co., Twightee, Ohio, (Cincinnati Suburb)
Clark Bros. Bolt Co., Milldale, Conn.
Cleveland Wrought Products Co., 3590 West 58th St., Cleveland, Ohio
Corbin Screw Corp'n, New Britain, Conn.
Detroit Screw Works, Detroit, Mich.
E. C. Manufacturing Co., 546-548 W. Harrison St., Chicago, Ill.
Eastern Bolt & Nut Co., Providence, R. I.
Ferry Cap & Set Screw Co., 2151 Scranton Road, Cleveland, Ohio
Fostoria Screw Co., Fostoria, Ohio
Keystone Screw Co., Yardley, Pa.
Metals Welding Co., 4400 Perkins Ave., Cleveland, Ohio
National Lock Co., Rockford, Ill.
New Haven Screw Co., 191-193 Foster St., New Haven, Conn.
Niagara Screw Co., 20 Lock St., Buffalo, N. Y.
*REED & PRINCE MFG. CO., Worcester, Mass...*p. 524*
Rhode Island Tool Co., 148 West River St., Providence, R. I.
Scovill Mfg. Co., 99 Mill St., Waterbury, Conn.
Shimer, Samuel J. & Sons, Milton Pa.
Standard Screw Products Co., Bellevue & Warren Ave., Detroit, Mich.
Standard Turnbuckle Co., Woolworth Bldg., New York, N. Y.
Steel Products Co., Cleveland, Ohio

Digitized by Google

U. S. Automatic Co., Amherst, Ohio
Western Automatic Machine Screw Co., Elyria, Ohio

—Lag
COLUMBUS BOLT WORKS, Columbus, Ohio ..*p. 522*

—Machine
AMERICAN SCREW CO., Providence R. I. ..*p. 520*
AUTOMATIC PRODUCTS CORP'N.' 199-203 Eighth St., Long Island City, N. Y...*p. 518*
Bell Co., 1555 Filmore Ave., Buffalo, N. Y.
BLAKE & JOHNSTON CO., Waterbury, Conn...*p. 491*
Corbin Screw Corp'n., New Britain, Conn.
Detroit Screw Works, Detroit, Mich.
Hubbell, Harvey, (Inc.), State St. & Bostwick Ave., Bridgeport, Conn.
International Machine & Screw Co., Warwick St., Springfield, Mass.
Keystone Screw Co., Yardley, Pa.
National Screw & Tack Co., 7413 Stanton Ave., Cleveland, Ohio
Peninsular Milled Screw Co., 1090 Lafayette East, Detroit, Mich.
Perry-Fay Co., Elyria, Ohio
Progressive Mfg. Co., Torrington, Conn.
Reading Screw Co., Main & Gay Sts., Norristown, Pa.
*REED & PRINCE MFG. CO., Worcester, Mass...*p. 524*

—Safety Set
Allen Mfg. Co., 135 Sheldon St., Hartford, Conn.
*BRISTOL CO., Waterbury, Conn...*p. 291*
Flower, Walter L. & Co., 312-314 S. 8th St., St. Louis, Mo.
New Haven Screw Co., 191-192 Foster St., New Haven Conn.

—Socket Head
Allen Mfg. Co., 135 Sheldon St., Hartford, Conn.

—Special
*REED & PRINCE MFG. CO., Worcester, Mass...*p. 524*

—Thumb
WILLIAMS, J. H. & CO., 70 Richards St., Brooklyn, N. Y...*p. 517*

—Wood
AMERICAN SCREW CO., Providence, R. I. *p. 520*
Bridgeport Screw Co., P. O. Box 1014, Bridgeport, Conn.
Corbin Screw Corp'n, New Britain, Conn.
International Machine & Screw Co., Warwick St., Springfield, Mass.
National Lock Co., Rockford, Ill.
Reading Screw Co., Main & Gay Sts., Norristown, Pa.
*REED & PRINCE MFG. CO., Worcester, Mass...*p. 524*

SCREWS AND SCREW BOXES (Hot Mill)
*AMERICAN FORGE & MACHINE CO., Canton, Ohio..*pp. 430, 431*

SEALING MACHINES
(See Carton Sealing Machines)

SEARCHLIGHTS
GENERAL ELECTRIC CO., Schenectady, N. Y...*pp. 18, 19, 20, 21*

SEPARATORS

—Ammonia
*DE LA VERGNE MACHINE CO., 1123 E. 138th St., New York, N. E...*p. 40*
United Machine & Mfg. Co., Canton, Ohio
YORK MFG. CO., York Pa...*p. 631*

—Centrifugal
AMERICAN TOOL & MACHINE CO., Boston 9, Mass...*p. 614*
Sharples Specialty Co., 23rd & Westmoreland Sts., Philadelphia, Pa.
*TOLHURST MACHINE WORKS, Troy, N. Y...*p. 616*

—Compressed Air
Nicholson, W. H. & Co., 12 Oregon St., Wilkes-Barre, Pa.
United Machine & Mfg. Co., Canton, Ohio

—Gasoline
Bousman Mfg. Co., (Inc.), 1153-57 Plainfield Ave., N. E. Grand Rapids, Mich.

—Magnetic
Buchanan, C. G. Co., (Inc.), 90 West St., New York, N. Y.

—Metal Chip
AMERICAN TOOL & MACHINE CO., Boston 9, Mass...*p. 614*
*DE LAVAL STEAM TURBINE CO., Trenton, N. J...*p. 22*
National Separator & Machine Co., 789 Boylston St., Boston, Mass.
OIL & WASTE SAVING MACHINE CO., 1509 Real Estate Trust Bldg., Philadelphia, Pa...*p. 615*
TOLHURST MACHINE WORKS, Troy, N. Y...*p. 616*

—Oil
Anderson, V. D. Co., 1953 W. 96th St., Cleveland, Ohio
*CRANE CO., 836 S. Michigan Ave., Chicago, Ill...*pp. 170, 171, 172, 173*
*DE LAVAL STEAM TURBINE CO., Trenton, N. J...*p. 22*
Direct Separator Co., Syracuse, N. Y.
DUNHAM, C. A. CO., 280 East Ohio St., Chicago, Ill...*p. 227*
*H. S. B. W.-COCHRANE CORP'N, Philadelphia, Pa...*pp. 146, 147*
*ILLINOIS ENGINEERING CO., "Eclipse"), Chicago, Ill...*pp. 210, 211*
Kelley, Benj. F. & Son, 25 Church St., New York, N. Y.
*KIELEY & MUELLER, (Inc.), ("Kieley"), 34 W. 13th St., New York, N. Y...*p. 212*
KRAUSE, ARTHUR E., Mountain Lakes, N. J...*p. 153*
Moffat Feed Water Heat & Purifier Co., Dayton, Ohio
*NATIONAL PIPE BENDING CO. ("National"), New Haven, Conn...*pp. 150, 151*
OIL & WASTE SAVING MACHINE CO., 1509 Real Estate Trust Bldg., Philadelphia, Pa...*p. 615*
OPEN COIL HEATER & PURIFIER CO., Indianapolis, Ind...*p. 149*
*PITTSBURGH VALVE, FOUNDRY & CONSTRUCTION CO., P. O. Box 1016, Pittsburgh, Pa...*pp. 192, 193*
Plant Engineering & Equipment Co. (Inc.), 192 Broadway, New York, N. Y.
Power Plant Specialty Co. ("Vater"), 1300 Monadnock Block, Chicago, Ill.
Robertson, Jas. L. & Sons ("Hine"), 78-80 Murray St., New York, N. Y.
*SCHUTTE & KOERTING CO., 1184 Thompson St., Philadelphia, Pa...*p. 159*
Standard Steam Specialty Co. ("Utility"), 366 3rd Ave., New York, N. Y.
*TOLHURST MACHINE WORKS, Troy, N. Y...*p. 616*
United Machine & Mfg. Co., Canton, Ohio
WEBSTER, WARREN & CO., Camden, N. J...*pp. 154, 155*

—Oil, Centrifugal
AMERICAN TOOL & MACHINE CO. ("Roper"), Boston 9, Mass...*p. 614*
OIL & WASTE SAVING MACHINE CO., 1509 Real Estate Trust Bldg., Philadelphia, Pa...*p. 615*
TOLHURST MACHINE WORKS, Troy, N. Y...*p. 616*

Se

Digitized by Google

SEPARATORS (Continued)

—Steam

Brennan, John & Co., 24th St. & M. C. R. R., Detroit, Mich.
Colles Heater & Specialty Co., 343 S. Dearborn St., Chicago, Ill.
*CRANE CO., 836 S. Michigan Ave., Chicago, Ill...*pp. 170, 171, 172, 173*
D'ESTE, JULIAN CO., 26 Canal St., Boston, Mass...*pp. 206, 207*
Direct Separator Co., Syracuse, N. Y.
Farnsworth Company, Conshohocken, Pa.
*H. S. B. W.-COCHRANE CORP'N, Philadelphia, Pa...*pp. 146, 147*
*ILLINOIS ENGINEERING CO. (''Eclipse''), Chicago, Ill...*pp. 210, 211*
Jacobs, Charles & Co. (''Lowden''), 258 Franklin St., Boston, Mass.
*KIELEY & MUELLER (Inc.), (''Kieley''), 34 W. 13th St., New York, N. Y...*p. 212*
Locke Regulator Co., 76 North St., Salem, Mass.
*NATIONAL PIPE BENDING CO. (''National''), New Haven, Conn...*pp. 150, 151*
Nicholson, W. H. & Co., 12 Oregon St., Wilkes-Barre, Pa.
Nightingale & Childs Co., 205 Congress St., Boston, Mass.
Ohio Body Blower Co., 9300 Detroit Ave., Cleveland, Ohio
OPEN COIL HEATER & PURIFIER CO., Indianapolis, Ind...*p. 149*
*PITTSBURGH VALVE, FOUNDRY & CONSTRUCTION CO., P. O. Box 1016, Pittsburgh, Pa...*pp. 192, 193*
Plant Engineering & Equipment Co. (Inc.), 192 Broadway, New York, N. Y.
Power Plant Specialty Co. (''Vater''), 1306 Monadnock Block, Chicago, Ill.
Robertson & Sons, Jas. L. (''Hine''), 78-80 Murray St., New York, N. Y.
Ross Schofield Co., 17 Battery Place, New York, N. Y.
SIMS CO., Erie, Pa...*p. 152*
Steam Appliance Co., 709 63rd Ave., West Allis, Wis.
Steam Equipment Mfg. Co., 8077 Jenkins Arcade Bldg., Pittsburgh, Pa.
United Machine & Mfg. Co., Canton, Ohio
WEBSTER, WARREN & CO., Camden, N. J...*pp. 154, 155*

SET COLLARS
(See Collars, Shaft)

SETTING-UP APPLIANCES (For Machine Tools)
STANDARD SHOP EQUIPMENT CO., 23rd St. & Hunting Park Ave., Philadelphia, Pa...*p. 515*

SEWAGE EJECTORS
(See Ejectors, Sewage)

SEWER PIPE MACHINERY (Clay)
Stevenson Co., Wellsville, Ohio

SHACKLES

—Chain and Anchor

Merrill Bros., Maspeth, N. Y.
Weimer Chain & Iron Co., Lebanon, Pa.

SHAFTING

*ALLIS-CHALMERS MFG. CO., Milwaukee, Wis...*pp. 28, 29*
Bliss & Laughlin, Inc., Harvey, Ill.
Brightman Mfg. Co., Marion Road, Columbus, Ohio
Camden Forge Co., Mt. Ephraim Ave., Camden, N. J.
Cedar Rapids Fdry. & Machine Co., 901-998 2nd Ave., W., Cedar Rapids, Iowa
Cumberland Steel Co. (''Cumberland Ground''), Cumberland, Md.
*FALLS CLUTCH & MACHINERY CO., Cuyahoga Falls, Ohio...*p. 330*
JEFFREY MFG. CO., 904 N. 4th St., Columbus, Ohio...*pp. 376, 377*
Jersey Forging Wks., 16th St. & Jersey Ave., Jersey City, N. J.

—Cold Drawn

AMERICAN TOOL & MACHINE CO., Boston 9, Mass...*p. 614*
Blum, Julius & Co., 532-40 W. 22nd St., New York, N. Y.
Brightman Mfg. Co., Marion Road, Columbus, Ohio
Cumberland Steel Co., Cumberland, Md.
DODGE SALES & ENGINEERING CO., Mishawaka, Ind...*pp. 42, 43, 326, 327, 328, 329*
*FALLS CLUTCH & MACHINERY CO., Cuyahoga Falls, Ohio...*p. 330*
Fitzsimmons Co., Youngstown, Ohio
Fitzsimons Steel & Iron Co., 3649 So. Racine Ave., Chicago, Ill.
*HILL CLUTCH CO., Cleveland, Ohio...*p. 331*
*MEDART PATENT PULLEY CO., St. Louis, Mo...*p. 333*
New England Drawn Steel Co., Mansfield, Mass.
Pardee, C. Works, Perth Amboy, N. J.
*UNION DRAWN STEEL CO., Beaver Falls, Pa...*p. 423*

—Flexible

Breeze Mfg. Co., 250 South St., Newark, N. J.
Coates Clipper Mfg. Co., 237 Chandler St., Worcester, Mass.
Cooper Flexible Transmission Co. (Inc.), 18th St. & 8th Ave., Brooklyn, N. Y.
Gem Mfg. Co., 1229-43 Goebel St., N. S., Pittsburgh, Pa.
Haskins, R. G. Co., 27 S. Desplaines St, Chicago, Ill.
Plank Flexible Shaft Machine Co., Grand Rapids, Mich.
Stow Flexible Shaft Co., 3452 Ludlow St., Philadelphia, Pa.
Stow Mfg. Co., 443 State St., Binghamton, N. Y.
Webb Mfg. Co., 245-247 N. J. R. R. Ave., Newark, N. J.
WHITE, S. S. DENTAL MFG. CO., 84 Market St., New York, N. Y...*p. 359*

—Forged

Camden Forge Co., Mt. Ephraim Ave., Camden, N. J.
*FALLS CLUTCH & MACHINERY CO., Cuyahoga Falls, Ohio...*p. 330*
Johnson, J. R. & Co. (Inc.), P. O. Box 515, Richmond, Va.
Standard Forging Co., 80 E. Jackson Blvd., Chicago, Ill.

—Forged and Turned

*FALLS CLUTCH & MACHINERY CO., Cuyahoga Falls, Ohio...*p. 330*
*HILL CLUTCH CO., Cleveland, Ohio...*p. 331*

—Hollow Bored

American Hollow Boring Co., Erie, Pa.

—Turned and Ground

AMERICAN TOOL & MACHINE CO., Boston 9, Mass...*p. 614*
*CALDWELL, H. W. & SON CO., 17th St. & Western Ave., Chicago, Ill...*p. 370*
DODGE SALES & ENGINEERING CO., Mishawaka, Ind...*pp. 42, 43, 326, 327, 328, 329*
*UNION DRAWN STEEL CO., Beaver Falls, Pa...*p. 423*

—Turned and Polished

Aborn Steel Co. (Inc.), 22 Clarke St., New York, N. Y.
Bliss & Laughlin (Inc.), Harvey, Ill.

Digitized by Google

*BROWN, A. & F. CO., 79 Barclay St., New York, N. Y...*p. 303*
*CALDWELL, H. W. & SON CO., 17th St. & Western Ave., Chicago, Ill...*p. 370*
Central Steel & Wire Co., 119 N. Peoria St., Chicago, Ill.
Columbia Steel & Shafting Co. ("Columbia"), Pittsburgh, Pa.
Compressed Steel Shafting Co., 1587 Hyde Park Ave., Boston 37, Readville, Mass.
DODGE SALES & ENGINEERING CO., Mishawaka, Ind...*pp. 42, 43, 326, 327, 328, 329*
*FALLS CLUTCH & MACHINERY CO., Cuyahoga Falls, Ohio..*p. 330*
Fitzsimons Steel & Iron Co., 3649 S. Racine Ave., Chicago, Ill.
*HILL CLUTCH CO., Cleveland, Ohio..*p. 331*
*MEDART PATENT PULLEY CO., St. Louis, Mo...*p. 333*
*UNION DRAWN STEEL CO., Beaver Falls, Pa...*p. 423*
*WOOD'S, T. B. SONS CO., Chambersburg, Pa...*pp. 334, 335*

SHAKING GRATES
(See Grates, Shaking)

SHAPER ATTACHMENTS
Stockbridge Machine Co., 68 Abbott St., Worcester, Mass.
Moore, H. A. Co., 313 Norton St., Rochester, N. Y.

SHAPERS
American Tool Works Co., Pearl & Eggleston Ave., Cincinnati, Ohio
Cincinnati Shaper Co., Cincinnati, Ohio
Davis Machine Tool Co., 305 St. Paul St., Rochester, N. Y.
Gould & Eberhardt, Chancellor Ave., Irvington, N. J.
Hanson-Whitney Machine Co., 169 Bartholomew Ave., Hartford, Conn.
Hendey Machine Co., Torrington, Conn.
Hollingworth Machine Tool Co., 2nd & Greenup Sts., Covington, Ky.
Kelly, R. A. Co. ("Kelly"), Jenia, Ohio
Milwaukee Shaper Co., 1029 Cold Spring Ave., Milwaukee, Wis.
Ohio Machine Tool Co., Kenton, Ohio
Osborne & Sexton Machinery Co., Columbus, Ohio
Potter & Johnson Machine Co., Pawtucket, R. I.
PRATT & WHITNEY CO., 111 Broadway, New York, N. Y...*p. 471*
Queen City Machine Tool Co., 1405 Sycamore St., Cincinnati, Ohio
Rhodes Mfg. Co., 984 Park St., Hartford, Conn.
Rockford Machine Tool Co., Rockford, Ill.
Smith & Mills Co., Cincinnati, Ohio
Springfield Machine Tool Co., Springfield, Ohio
Steptoe, John Co., Stock Yards Station, Cincinnati, Ohio
Stockbridge Machine Co., 68 Abbott St., Worcester, Mass.
Streine Tool & Mfg. Co., New Bremen, Ohio

—Draw Cut
Morton Mfg. Co., Muskegon Heights, Mich.

—Pillar
Cincinnati Shaper Co., Cincinnati, Ohio
Columbus Machine Tool Co., Fairgrove Ave., Hamilton, Ohio
Smith & Mills Co., Cincinnati, Ohio

—Travelling Head
Boynton & Plummer (Inc.), Chester Depot, Vt.
Cincinnati Shaper Co., Cincinnati, Ohio

SHAPES
—Brick
Gardner, James Jr. Co., Ebensburg, Pa.

—Iron
*UNION DRAWN STEEL CO., Beaver Falls, Pa...*p. 423*

—Steel
Franklin Steel Works, Franklin, Pa.
GLASGOW IRON CO., Pottstown, Pa...*p. 99*
Phoenix Iron Co., 22 S. 15th St., Philadelphia, Pa.
Pollak Steel Co., Cincinnati, Ohio
*UNION DRAWN STEEL CO., Beaver Falls, Pa...*p. 423*

—Steel (Cold Drawn)
*UNION DRAWN STEEL CO., Beaver Falls, Pa...*p. 423*

—Steel (Pressed)
AMERICAN PULLEY CO., 4200 Wissahickon Ave., Philadelphia, Pa...*p. 322*
Boston Pressed Metal Co., 175 Union St., Worcester, Mass.
GEUDER, PAESCHKE & FREY CO., Western Valley, Milwaukee, Wis. *p. 434*
KEY BOILER EQUIPMENT CO., 27th & McCasland Ave., East St. Louis, Ill...*pp. 100, 101*
McCord & Co., 1905 Peoples Gas Bldg., Chicago, Ill.
Worcester Stamped Metal Co., 9 Hunt St., Worcester, Mass.

SHARPENING DEVICES
Chicago Wheel & Mfg. Co., 1101-1103 W. Monroe St., Chicago, Ill.
Luther Grinder Mfg. Co., 285 S. Water St., Milwaukee, Wis.

—Rock Drill
*INGERSOLL-RAND CO., 11 Broadway, New York, N. Y...*pp. 546, 547*

SHARPENING STONES
(See Stones, Sharpening)

SHAVINGS AND SAWDUST COLLECTING SYSTEMS
*ALLINGTON & CURTIS MFG. CO., Saginaw, Mich...*p. 554*

SHEARS
—Alligator
Doelger & Dirston, 505-507 Cedar St., Milwaukee, Wis.
*LONG & ALLSTATTER CO., Hamilton, Ohio..*pp. 440, 441*
Streine Tool & Mfg. Co., New Bremen, Ohio

—Angle
BERTSCH & CO., Cambridge City, Ind...*p. 442*
Cedar Rapids Foundry & Machine Co., 901-998 2nd Ave. W., Cedar Rapids, Iowa
Kidder, J. F. Mfg. Co., Burlington, Vt.
Kling Bros. Engineering Works, 1300 N. Kostner Ave., Chicago, Ill.
*LONG & ALLSTATTER CO., Hamilton, Ohio..*pp. 440, 441*
NILES-BEMENT-POND CO., 111 Broadway, New York, N. Y...*p. 470*
Pels, Henry & Co., 90 West St., New York, N. Y.
WATSON-STILLMAN CO., 35 Church St., New York, N. Y...*p. 596*

—Bar
BERTSCH & CO., Cambridge City, Ind...*p. 442*
Hendley & Whittemore Co., Beloit, Wis.
Kling Bros. Engineering Works, 1300 N. Kostner Ave., Chicago, Ill.
*LONG & ALLSTATTER CO., Hamilton, Ohio *pp. 440, 441*
Massillon Foundry & Machine Co., Massillon, Ohio

Sh

Digitized by Google

SHEARS (Continued)
NILES-BEMENT-POND CO., 111 Broadway, New York, N. Y...*p. 470*
Pels, Henry & Co., 90 West St., New York, N. Y.
WATSON-STILLMAN CO., 35 Church St., New York, N. Y...*p. 596*
Youngstown Foundry & Machine Co., Youngstown, Ohio

—Billet
*LONG & ALLSTATTER CO., Hamilton, Ohio *pp. 440, 441*

—Circle
*BLISS, E. W. CO., Brooklyn, N. Y...*pp. 438, 439*
QUICKWORK CO. (''Quickwork''), St. Mary's, Ohio..*p. 444*
TORRINGTON MFG. CO., Torrington, Conn. *p. 641*

—Gap
Steine Tool & Mfg. Co., New Bremen, Ohio

—Gate
BERTSCH & CO., Cambridge City, Ind...*p. 442*
*LONG & ALLSTATTER CO., Hamilton, Ohio..*pp. 440, 441*
NILES-BEMENT-POND CO., 111 Broadway, New York, N. Y...*p. 470*
WOOD, R. D. & CO., Philadelphia, Pa...*p. 597*

—Hydraulic
BERTSCH & CO., Cambridge City, Ind...*p. 442*
Camden Iron Works, Camden, N. J.
WATSON-STILLMAN CO., 35 Church St., New York, N. Y...*p. 596*
WOOD, R. D. & CO., Philadelphia, Pa...*p. 597*

—Irregular Cutting
QUICKWORK CO., (''Quickwork''), St. Mary's, Ohio..*p. 444*

—Metal (Hand Power)
BERTSCH & CO., Cambridge City, Ind...*p. 442*
Heartley Machine, Variety Iron & Tool Works, Summit & Locust Sts., Toledo, Ohio
Oliver, W. W. Mfg. Co., 1483 Niagara St., Buffalo, N. Y.
TORRINGTON MFG. CO., Torrington, Conn. *p. 641*
Tucker, W. W. & C. F., 191 Franklin Ave., Hartford. Conn.
Whitney Metal Tool Co., 110 Forbes St., Rockford, Ill.

—Plate
Beatty Machine & Mfg. Co., Hammond, Ind.
BERTSCH & CO., Cambridge City, Ind...*p. 442*
Newbold, R. S. J. Son Co., Norristown, Pa.
NILES-BEMENT-POND CO., 111 Broadway. New York, N. Y...*p. 470*
QUICKWORK CO. (''Quickwork''), St. Marys, Ohio..*p. 444*
WATSON-STILLMAN CO., 35 Church St., New York, N. Y...*p. 596*
WOOD, R. D. & CO., Philadelphia, Pa...*p. 597*

—Power
Badger State Machine Co., Janesville, Wis.
BERTSCH & CO., Cambridge City, Ind...*p. 442*
Canton Foundry & Machine Co. (''Canton''), Canton, Ohio
Cedar Rapids Foundry & Machine Co., 901-908 2nd Ave. W., Cedar Rapids, Iowa
Clark Foundry Co., Rumford, Me.
Cleveland Punch & Shear Works Co., 3917 St. Clair Ave., Cleveland, Ohio
Covington Machine Co., Covington, Va.
Hendley & Whittemore Co., Beloit, Wis.
Imperial Machine Co., 1611 Central Ave., Minneapolis, Minn.
Ironton Punch & Shear Co., 511 N. 2nd St., Ironton, Ohio
Loy & Nawrath Co., 21-29 Runyon St., Newark, N. J.
NILES-BEMENT-POND CO., 111 Broadway, New York, N. Y. *p. 470*
QUICKWORK CO. (''Quickwork''), St. Marys, Ohio..*p. 444*
Stoll, D. H. Co., 28 Lansing St., Buffalo, N. Y.
Wickes Bros., Saginaw, Mich.

—Rotary
*BLISS, E. W. CO., Brooklyn, N. Y...*pp. 438, 439*
Ham, L. M. Co., 150 Portland St., Boston, Mass.
NIAGARA MACHINE & TOOL WORKS, Buffalo, N. Y...*p. 443*
QUICKWORK CO. (''Quickwork''), St. Mary's, Ohio..*p. 444*
TORRINGTON MFG. CO., Torrington, Conn. *p. 641*

—Squaring
BERTSCH & CO., Cambridge City, Ind...*p. 442*
*BLISS, E. W. CO., Brooklyn, N. Y...*pp. 438, 439*
NIAGARA MACHINE & TOOL WORKS, Buffalo, N. Y...*p. 443*
NILES-BEMENT-POND CO., 111 Broadway, New York, N. Y...*p. 470*
Streine Tool & Mfg. Co., New Bremen, Ohio

—Throat
Kling Bros. Engineering Works, 1300 N. Kostner Ave., Chicago, Ill.

SHEAVES

—Rope
*ALLIS-CHALMERS MFG. CO., Milwaukee, Wis...*pp. 28, 29*
AMERICAN HOIST & DERRICK CO., St. Paul, Minn...*p. 383*
BASS FOUNDRY & MACHINE CO., Fort Wayne, Ind...*p. 57*
*BROWN, A. & F. CO., 79 Barclay St., New York, N. Y...*p 303*
*CALDWELL, H. W. & SON CO., 17th St. & Western Ave., Chicago, Ill...*p. 370*
*CALDWELL, W. E. CO., 340 E. Brandeis St., Louisville, Ky...*p. 323*
DODGE SALES & ENGINEERING CO., Mishawaka, Ind...*pp. 42, 43, 326, 327, 328, 329*
*FALLS CLUTCH & MACHINERY CO., Cuyahoga Falls, Ohio..*p. 330*
*FULLER-LEHIGH CO., Fullerton, Pa...*p. 128*
*HILL CLUTCH CO., Cleveland, Ohio..*p. 331*
Horton, John T. Co., 242 Bradhurst Ave., New York, N. Y.
*JONES, W. A. FOUNDRY & MACHINE CO., 4415 W. Roosevelt Rd., Chicago, Ill. *pp. 312, 313, 314, 315*
Litchfield Foundry & Machine Co., Litchfield, Ill.
*MEDART PATENT PULLEY CO., St. Louis, Mo...*p. 383*
OTTUMWA IRON WORKS (Inc.), Ottumwa, Iowa..*p. 385*
POOLE ENGINEERING & MACHINE CO., Woodberry, Baltimore, Md. *pp. 316, 317*
Pyott Foundry Co., 328 N. Sangamon St., Chicago, Ill.
*ROEBLING'S, JOHN A. SONS CO., Trenton, N. J...*p. 409*
*WOOD'S, T. B. SONS CO., Chambersburg, Pa...*pp. 334, 335*

—V-Belt
DODGE SALES & ENGINEERING CO., Mishawaka, Ind...*pp. 42, 43, 326, 327, 328, 329*

Digitized by Google

SHEET LEAD MACHINERY
ROBERTSON, JOHN & CO., 133 Water St., Brooklyn, N. Y...*p. 595*

SHEET METAL WORK
*ALLINGTON & CURTIS MFG. CO., Saginaw, Mich...*p. 554*
Bridgman Bros. Co., 120 South 30th St., Philadelphia, Pa.
Codd, E. J. Co., 700 S. Caroline St., Baltimore, Md.
CONNERY & CO. (Inc.), 2nd and Luzerne Sts., Philadelphia, Pa...*pp. 651, 780*
Hodge Boiler Works, 99 Sumner St., East Boston, Mass.
HONHORST, JOS. CO., 1016-20 W. 6th St., Cincinnati, Ohio..*p. 64*
Merrill, C. J. (Inc.), 85 Kennebec St., Portland, Me.
MILWAUKEE RELIANCE BOILER WKS., Milwaukee, Wis...*p. 148*
National Blow Pipe & Mfg. Co., 738 Dryades St., New Orleans, La.
NEWBURGH STEAM BOILER WORKS, (P. Delany & Co.), Newburgh, N. Y...*p. 64*
Northern Blower Co., West 65th & Dennison Ave., Cleveland, Ohio
Richmond Engineering Co., 937 Brook Ave., Richmond, Va.
TRANSUE & WILLIAMS STEEL FORGING CORP'N, Alliance, Ohio..*p. 432*
Van Noorden, E. Co., 102 Magazine St., Roxbury, Mass.
Wilson Steam Boiler Co., 1919-27 S. 20th St., Omaha, Neb.

SHEET METAL WORKING MACHINERY
BERTSCH & CO., Cambridge City, Ind...*p. 442*
*BLISS, E. W. CO., Brooklyn, N. Y...*pp. 438, 439*
Dreis Krump Mfg. Co., 2919 So. Halsted St., Chicago, Ill.
Engine & Machinery Co., Marion Ave. & Navarre Rd., S. W., Canton, Ohio
GEUDER, PAESCHKE & FREY CO., Western Valley, Milwaukee, Wis...*p. 434*
*HENDRICK MFG. CO., Carbondale, Pa. *p. 653, 786*
*KEELER, E. CO., Williamsport, Pa...*p. 69*
KROESCHELL BROS. CO., 460 West Erie St., Chicago, Ill...*p. 75*
Leffler, Charles & Co., 49-73 Clymer St., Brooklyn, N. Y.
Loy & Nawrath Co., 21-29 Runyon St., Newark, N. J.
Max Ams Machine Co., 101 Park Ave., New York, N. Y.
NIAGARA MACHINE & TOOL WORKS, Buffalo, N. Y...*p. 448*
NILES-BEMENT-POND CO., 111 Broadway, New York, N. Y...*p. 470*
Pettingell Machine Co., Amesbury, Mass.
QUICKWORK CO. ("Quickwork"), St. Mary's, Ohio..*p. 444*
SKINNER BROS. MFG. CO. (Inc.), 1400-1490 Vandevanter Ave., St. Louis, Mo...*p. 621*
Streine Tool & Mfg. Co., New Bremen, Ohio
Toledo Machine & Tool Co., Toledo, Ohio
TORRINGTON MFG. CO., Torrington, Conn. *p. 641*
V. & O. Press Co., Glendale, Brooklyn, N. Y...*p. 814*
WELLER MFG. CO., 1820-1856 N. Kostner Ave., Chicago, Ill...*p. 381*
Yoder Co., Walworth Ave. at West 58th St., Cleveland, Ohio

SHEET MILL MACHINERY
Aetna Foundry & Machine Co., Warren, Ohio
BERTSCH & CO., Cambridge City, Ind...*p. 442*

SHEETS
—Aluminum
Cleveland Metal Products Co., 7609 Pratt Ave., Cleveland, Ohio

—Brass
AMERICAN BRASS CO., Waterbury, Conn. ..*p. 414*
Baltimore Tube Co., Inc., Baltimore, Md.
Bristol Brass Co., Bristol, Conn.
Hungerford, U. T. Brass & Copper Co., 80 Lafayette St., New York, N. Y.
Scovill Mfg. Co., 99 Mill St., Waterbury, Conn.
Taunton-New Bedford Copper Co., Taunton Mass

—Copper
AMERICAN BRASS CO., Waterbury, Conn. ..*p. 414*

—Fibre
*CONTINENTAL FIBRE CO., Newark, Del. ..*p. 418*
DELAWARE HARD FIBRE CO. ("D. H. Egyptian"). Wilmington, Del...*p. 419*
DIAMOND STATE FIBRE CO. ("Condensite Celoron"), Bridgeport, Pa...*p. 420*

—Galvanized
American Sheet & Tin Plate Co., Frick Bldg., Pittsburgh, Pa.
ANDREWS STEEL CO., Newport, Ky...*p. 421*
Inland Steel Co, 1105 First Natl. Bank Bldg., Chicago, Ill.

—Hard Rubber
American Hard Rubber Co., 11 Mercer St., New York, N. Y.
GOODRICH, B. F. RUBBER CO., Akron, O. ..*pp. 258, 259*
Stokes, Jos. Rubber Co., Trenton, N. J.

—Iron
Nazareth Foundry & Machine Co., 41-45 Easton Road, Nazareth, Pa.

—Nickel
Haring, Ellsworth, 114 Liberty St., New York, N. Y.
Seymour Mfg. Co., Seymour, Conn.

—Nickel Silver
AMERICAN BRASS CO., Waterbury, Conn. ..*p. 414*

—Steel
Allegheny Steel Co., Pittsburgh, Pa.
ANDREWS STEEL CO., Newport, Ky...*p. 421*
Carbon Steel Co., Foot of 32nd St., Pittsburgh, Pa.
Inland Steel Co., 1105 First National Bank Bldg., Chicago, Ill.
Jessop, Wm. & Sons (Inc.), 91 John St., New York, N. Y.
Otis Steel Co., 1140 Leaders News Bldg., Cleveland, Ohio
Republic Iron & Steel Co., Youngstown, Ohio
Wood, Alan Iron & Steel Co., Widener Bldg., Philadelphia, Pa.
Youngstown Sheet & Tube Co., Youngstown, Ohio

—Steel (Black)
ANDREWS STEEL CO., Newport, Ky...*p. 421*

—Steel (Blue Annealed)
ANDREWS STEEL CO., Newport, Ky...*p. 421*

—Zinc
Hazel Atlas Glass Co., Wheeling, W. Va.
Illinois Zinc Co., Peru, Ill.

SHELL MAKING MACHINERY
HYDRAULIC PRESS MFG. CO. (The), Mount Gilead, Ohio...*p. 593*

Digitized by Google

SHELL MAKING MACHINERY (Continued)
*JONES & LAMSON MACHINE CO., Springfield, Vt...*pp. 450, 451, 452, 453, 454*
NILES-BEMENT-POND CO., 111 Broadway, New York, N. Y...*p. 470*
NOBLE & WESTBROOK MFG. CO., Hartford, Conn...*p. 494*
STEINLE TURRET MACHINE CO., Madison, Wis...*p. 447*
WATSON-STILLMAN CO., 35 Church St., New York, N. Y...*p. 596*
WOOD, R. D. & CO., Philadelphia, Pa...*p. 597*

SHELLS

—Boiler
LASKER IRON WORKS, 3201 So. Lincoln St., Chicago, Ill...*p. 655*

—Boiler, Welded
American Welding Co., Carbondale, Pa.
*CASEY-HEDGES CO., Chattanooga, Tenn. ...*pp. 60, 61*
*KEELER, E. CO., Williamsport, Pa...*p. 69*

—Ice Machine, Welded
*CASEY-HEDGES CO., Chattanooga, Tenn. *pp. 60, 61*

SHELVING, METAL
Dexter Metal Mfg. Co., Camden, N. J.
Durand Steel Locker Co., 76 W. Monroe St., Chicago, Ill.
IRVING IRON WORKS CO., 3rd St. & Dutchkill Creek, Long Island City, N. Y. ..*p. 662*
Lyon Metallic Mfg. Co. Aurora, Ill.
Manufacturing Equipment & Engrg. Co., Framingham, Mass.
National Scale Co., Chicopee Falls, Mass.
NEWHALL CHAIN FORGE & IRON CO., 90 West St., New York, N. Y...*p. 410*
Pennsylvania Wire Works, 520 N. Third St., Philadelphia, Pa.
Steel Equipment Corpn., Avenel, N. J.
Terrell's Equipment Co., Grand Rapids, Mich.
Yawman & Erbe Mfg. Co., Rochester. N. Y.

SHIMS
Victor Mfg. & Gasket Co., 5750 W. Roosevelt Rd., Chicago, Ill.

SHIP CABLES
*ROEBLING'S, JOHN A., SONS CO, Trenton, N. J...*p. 409*

SHIP STEERING ENGINES
(See Engines, Steering)

SHIPYARD MACHINERY
Norbom Engineering Co., 712 Denckla Bldg., Philadelphia, Pa.

SHOE LACE TIPPING MACHINES
FRANKLIN MACHINE CO., P. O. Address Box 1393, Providence, R. I...*p. 9*

SHOE MAKING MACHINERY
Freeman, Louis G. Co., 909-11 Sycamore St., Cincinnati, Ohio

SHOP FURNITURE
Cleveland Wire Spring Co., E. 38th & Hamilton Ave., Cleveland, Ohio
Lupton's, David Sons Co,. Allegheny Ave. & Tulip St., Philadelphia, Pa.
Manufacturing -Equipment & Engineering Co., Framingham, Mass.
NEW BRITAIN MACHINE CO., New Britain, Conn...*p. 463*

SHOVEL MAKING MACHINERY
BERTSCH & CO., Cambridge City, Ind...*p. 442*

SHOVELING MACHINES
Lake Shore Engine Works, Marquette, Mich.
Myers-Whaley Co. (Inc.), Knoxville, Tenn.
Northwest Engineering Works ("Northwest"), Green Bay, Wis.

SHOVELS, STEAM
AMERICAN HOIST & DERRICK CO., St. Paul, Minn...*p. 383*
Bucyrus Co., South Milwaukee, Wis.
Fairbanks Steam Shovel Co., Marion, Ohio
Marion Steam Shovel Co., Marion, Ohio
Osgood Co., Marion, Ohio
The Automatic Shovel Co., Lorain, Ohio
Toledo Foundry & Machine Co., Toledo, Ohio

SHREDDING MACHINERY
Abbe Engrg. Co., 220 Broadway, New York, N. Y.
FULTON IRON WORKS CO.. St Louis, Mo. ...*p. 37*
JEFFREY MFG. CO., 904 N. 4th St., Columbus, Ohio...*pp. 376, 377*
VALLEY IRON WORKS CO., Appleton, Wis. *p. 647*
WILLIAMS PATENT CRUSHER & PULVERIZER CO., St. Louis, Mo...*pp. 602, 603*

SIFTING MACHINERY
Lovewell-Henrici Co., Chelsea, Mass.

SIGHT FEEDS
LONERGAN, J. E. CO., 211-215 Race St., Philadelphia, Pa...*pp. 203, 289*
*LUNKENHEIMER CO., Cincinnati, Ohio... *pp. 184, 185, 186, 187, 188, 189*
*RICHARDSON-PHENIX CO., 126 Reservoir Ave., Milwaukee, Wis...*pp. 248, 249*

SIGNALS

—Electric Railway
WESTINGHOUSE TRACTION BRAKE CO., Wilmerding, Pa...*pp. 550, 551*
AMERICAN INSULATING MACHINERY CO., Philadelphia, Pa...*p. 638*

—Industrial Plant
Benjamin Electric Mfg. Co., 806 W. Washington Blvd., Chicago, Ill.

SILENCERS (Engine)
Maxim Silencer Co., 83 Homestead Ave., Hartford, Conn.
GEUDER, PAESCHKE & FREY CO. ("Maxim"), Western Valley, Milwaukee, Wis... *p. 434*

SILK MANUFACTURING MACHINERY
Harrisburg Foundry & Machine Works, Harrisburg, Pa.
Saco-Lowell Shops, 77 Franklin St., Boston, Mass.

SINTERING PLANT MACHINERY
BARTLETT, C. O. & SNOW CO., Cleveland, Ohio...*p. 367*

SIPHONS (Steam)
Ohio Injector Co., S. Main St., Wadsworth, Ohio
*SCHUTTE & KOERTING CO. ("Universal"), 1184 Thompson St., Philadelphia, Pa...*p. 159*

SIRENS (Steam and Air)
AMERICAN STEAM GAUGE & VALVE MFG. CO., Boston, Mass...*pp. 200, 201*
*BROWN, A. & F. CO., 79 Barclay St., New York, N. Y...*p. 303*

SKYLIGHTS, STEEL
Dee, William V., Co., 168-170 Wade St., Bridgeport, Conn.
Drove, G. Co. ("Anti-Pluvius"), Bridgeport, Conn.
Lupton's, David Sons Co., Allegheny Ave. & Tulip St., Philadelphia, Pa.
Van Noorden, E. Co., 102 Magazine St., Roxbury, Mass.

Digitized by Google

SLABS, STEEL
American Tube & Stamping Co., Bridgeport, Conn.

SLATE WORKING MACHINERY
Flory, S. Mfg. Co., Bangor, Pa.

SLEEVES (Propeller Shaft)
SANDUSKY FOUNDRY & MACHINE CO., Sandusky, Ohio...*p. 646*

SLINGS

—Chain
MORRIS, HERBERT (Inc.), 1-15 Lawrence Place, Buffalo, N. Y...*p. 402*
NEWHALL CHAIN FORGE & IRON CO., 90 West St., New York, N. Y...*p. 410*
Weimer Chain & Iron Co., Lebanon, Pa.

—Wire Rope
Macwhyte Co., Kenosha, Wis.
MORRIS, HERBERT (Inc.), 1-15 Lawrence Place, Buffalo, N. Y...*p. 402*
*ROEBLING'S, JOHN A., SONS CO., Trenton, N. J...*p. 409*

SLITTING AND REWINDING MACHINES
Cameron Machine Co., 61 Poplar St., Brooklyn, N. Y.

SLITTING MACHINES (Metal)
BLAKE & JOHNSON CO., Waterbury, Conn. *p. 491**
*BLISS, E. W. CO., Brooklyn, N. Y...*pp. 438 439*
NILES-BEMENT-POND CO., 111 Broadway, New York, N. Y...*p. 470*
TORRINGTON MFG. CO., Torrington. Conn. ..*p. 641*

SLOTTING ATTACHMENTS (Shaper or Planer)
Moore, H. A. Co., 313 Norton St., Rochester, N. Y.

SLOTTING MACHINES
Betts Machine Co., Rochester, N. Y.
Craftsman Tool Co., Conneaut, Ohio
DILL, T. C. MACHINE CO. (Inc.), Philadelphia, Pa...*p. 468*
NATIONAL ACME CO. (''Namco''), Cleveland, Ohio...*pp. 464, 465*
Newton Machine Tool Works, Inc., 23rd & Vine Sts., Philadelphia, Pa.
NILES-BEMENT-POND CO., 111 Broadway, New York, N. Y...*p. 470*
Swind Machinery Co., 1110 Widener Bldg., Philadelphia, Pa.

SLUICE GATES
(See Gates, Sluice)

SMELTING MACHINERY
Traylor Engrg. & Mfg. Co., Allentown, Pa.
*WORTHINGTON PUMP & MACHINERY CORPN., 115 Broadway, New York, N. Y. ..*pp. 44, 45, 46, 47*

SMOKE CONSUMERS
Monarch Soot Remover Co. (Inc.), 261 Franklin St., Boston, Mass.
Scharf Smoke Preventer Co., 126 N. Adams St., Ypsilanti, Mich.

SMOKE RECORDERS
Hamler Eddy Smoke Recorder Co., 3906 S. Halsted St., Chicago, Ill.

SMOKE STACKS AND FLUES
(See Stacks, Steel)

SMOKELESS FURNACES
(See Furnaces, Smokeless)

SNOW PLOWS
Phoenix Mfg. Co., Eau Claire, Wis.

SOCKETS, WIRE ROPE
(See Wire Rope Fastenings)

SOLDER
Empire Metal Co., Syracuse, N. Y.
LUMEN BEARING CO., Buffalo, N. Y...*p. 416*
Michigan Smelting & Refining Co., Detroit, Mich.
Jacobson, I. M. & Sons Co. (''Motex''), 920-928 Catherine St., Detroit, Mich.
Michigan Smelting & Refining Co., Detroit, Mich.
National Lead Co., 111 Broadway, New York, N. Y.
Pacific Metal Works, 153 First St., San Francisco, Cal.
Pittsburgh White Metal Co. (''Rhinehart''), 160 Leroy St., New York, N. Y.
Riverside Metal Refining Co., Connellsville, Pa.

SOLDER

—Aluminum
Metals Welding Co., 4400 Perkins Ave., Cleveland, Ohio

—Silver
ATKINS, E. C. & CO. (Inc.), Indianapolis, Ind...*p. 506*

SOLDER WIRE MACHINERY
ROBERTSON, JOHN, & CO., 133 Water St., Brooklyn, N. Y...*p. 595*

SOLDERING IRONS (Electric)
*GENERAL ELECTRIC CO., Schenectady, N. Y...*pp. 18, 19, 20, 21*

SOLVENT RECOVERY APPARATUS
DEVINE, J. P. CO., 135 Clinton St., Buffalo, N. Y...*pp. 606, 607*

SOOT BLOWING SYSTEMS
*BAYER STEAM SOOT BLOWER CO., 4056 Park Ave., St. Louis, Mo...*p. 105*
Diamond Power Specialty Co., 56 Oakland Ave., Detroit, Mich.
Marion Machine Foundry & Supply Co., Marion, Ind.
Monarch Soot Remover Co. (Inc.), 261 Franklin St., Boston, Mass.
Vulcan Soot Cleanser Co. (''Vulcan''), DuBois, Pa.

SPACING TABLES (Structural Shop)
Norbom Engineering Co. (''Lydsholm''), 712 Denckla Bldg., Philadelphia, Pa.
Steel Utilities (Inc.), 425 Kinney Bldg., Newark, N. J.
Thomas Spacing Machine Co., 1226 Fulton Bldg., Pittsburgh, Pa.

SPARK PLUGS
(See Plugs, Spark)

SPECIAL MACHINERY
Advance Mfg. Co., Hamilton, Ohio
Akron Gear & Engineering Co., 44 East South St., Akron, Ohio
AMERICAN INSULATING MACHINERY CO., Philadelphia, Pa...*p. 638*
American Machine & Foundry Co., 5520 Second Ave., Brooklyn, N. Y.
Atlas Machine Co., 140 Manhan St., Waterbury, Conn.
Baird Machine Co., Bridgeport, Conn.
BERTSCH & CO., Cambridge City, Ind...*p. 442*
Bickett Machine & Mfg. Co., Cincinnati, Ohio
Black-Clawson Co., Hamilton, Ohio
Blair Tool & Machine Works (Inc.), 515 Greenwich St., New York, N. Y.
*BLISS, E. W. CO., Brooklyn, N. Y...*pp. 438, 439*
Boeger-Meyer Machine & Tool Co., 59-65 McWhorter St., Newark, N. J.
Boston Scale & Machine Co., 100 Ruggles St., Boston 20, Mass.
Bradley Mach. Co., Bridgeport, Conn.
Bridgeport Engineering Co., Bridgeport, Conn.

Sp

Digitized by Google

SPECIAL MACHINERY (Continued)

*BROWN, A. & F. CO., 79 Barclay St., New York, N. Y...*p. 303*

Brown Engine Co., Fitchburg, Mass.

Bultman, F. H. Co., 10271 Berea Road, Cleveland, Ohio

BURROUGHS, CHARLES CO. (The), Newark, N. J...*p. 590*

Centre Foundry & Machine Co., Wheeling, W. Va.

Chickasaw Machine & Foundry Co., Memphis, Tenn.

City Machine & Tool Works, 3 & June Sts., Dayton, Ohio

Cleveland Machine Tool Works, 18511 Euclid Ave., Cleveland, Ohio

Colton, Arthur Co., 2600 East Jefferson Ave., Detroit, Mich.

Colton, Arthur Co., Jefferson Ave., Detroit, Mich.

Columbia Machine Tool Co. Fairgrove Ave., Hamilton, Ohio

Columbus Die Tool & Machine Co., 955 Cleveland Ave., Columbus, Ohio

Cooper, C. & G. Co., Mt. Vernon, Ohio

Cowdrey, C. H. Machine Works, 20 Main St., Fitchburg, Mass.

*CRAMP, WM. & SONS SHIP & ENGINE BLDG. CO., Richmond & Norris Sts., Philadelphia, Pa...*pp. 30, 31*

Crawford Tool & Mfg. Co., 355 Union Park Court, Chicago, Ill.

Cresson-Morris Co., Philadelphia, Pa.

Dienelt & Eisenhardt, Inc., 1304 N. Howard St., Philadelphia, Pa.

DOVE-SMITH & SON, Niagara Falls, N. Y. ..*p. 492*

Driggs Ordnance & Mfg. Co., 149 Broadway, New York, N. Y.

ELLICOTT MACHINE CORPN., Baltimore, Md...*p. 588*

Elyria Machine Co., Elyria, Ohio

Emery, A. H., Maple Ave., Glenbrook, Conn.

*FALLS CLUTCH & MACHINERY CO., Cuyahoga Falls, Ohio...*p. 330*

FARRAR & TREFTS, Buffalo, N. Y...*p. 652*

*FAWCUS MACHINE CO., 2818 Smallman St., Pittsburgh, Pa...*p. 307*

Fenn Mfg. Co., Hartford, Conn.

FRANKLIN MACHINE CO., P. O. Address Box 1893, Providence, R. I...*p. 9*

Fulton Machine Tool Co., 1422 W. Randolff St., Chicago, Ill.

Furman-Fisher Corpn., 30 Church St., New York, N. Y.

Gardam & Son (Inc.), 114 Park Place, New York, N. Y.

Geier Co., 5102 St. Clair Ave., Cleveland, O.

Gem City Machine Co., 434 E. First St., Dayton, Ohio

Gerdes Co. (Inc.), 30 Church St., New York, N. Y.

Greenlee Bros. & Co., Rockford, Ill.

Griswold, Geo. M. Machine Co., New Haven, Conn.

Hall Mfg. Co., Abington, Mass.

Hart, Frederick & Co., Inc., 837 Main St., Poughkeepsie, N. Y.

Hay's, Sam'l. W. Sons, 1406 Keenan Bldg., Pittsburgh, Pa.

*HILL CLUTCH CO., Cleveland, Ohio...*p. 331*

Hinsman Machine & Tool Co., Elm St., Westfield, Mass.

HOGGSON & PETTIS MFG. CO., New Haven, Conn...*pp. 512, 513, 514*

Hubbard's, Norman, Sons, 265 Water St., Brooklyn N. Y.

*JOLLY J. & W., (Inc.), Holyoke, Mass. ..*p. 32*

Kotten Machine Co., West Side Ave. and Penn R. R., Jersey City, N. J.

KOVEN, L. O. & BROTHER, 154 Ogden Ave., Jersey City, N. J...*p. 605*

Lake Erie Engineering Works, Buffalo, N. Y.

*LAMMERT & MANN CO., Wood & Walnut Sts., Chicago, Ill...*p. 561*

Langelier Mfg. Co., 51 Washington Ave., Arlington, Cranston, R. I.

LASKER IRON WORKS, 3201 So. Lincoln St., Chicago, Ill...*p. 655*

Lebanon Gear & Machine Works, 15th and Willow Sts., Lebanon, Pa.

Leighton, H. J., 1017 W. Fayette St., Syracuse, N. Y.

Lincoln Iron Works, 255 West St., Rutland, Vt.

Lincoln Machine Co., 1068 Main St., Pawtucket, R. I.

Lippincott-Carwen Corpn., Erie Ave. and Richmond St., Philadelphia, Pa.

Lynd-Farquhar Co., 419-425 Atlantic Ave., Boston, Mass.

Mantle & Co., 1907 Park Ave., New York, N. Y.

Marshall Foundry Co., 1st Natl. Bank Bldg., Pittsburgh, Pa.

Marvin & Casler Co., Canastota, N. Y.

Marvin Mfg. Co., Urbana, Ohio

Mehl Machine Tool & Die Co. (''Mehl Made''), Roselle, N. J.

Mergenthaler Co., 116 Hollingsworth St., Baltimore, Md.

Meriden Press & Drop Co., 153 State St., Meriden, Conn.

Meldrum-Gabrielson Corpn., Syracuse, N. Y.

Munson, E. G., Carton Ave., Utica, N. Y.

Nestor Mfg. Co. 40 W. 13th St, New York, N. Y.

Nilson, A. H. Machine Co., 1525 Railroad Ave., Bridgeport, Conn.

Nilson-Miller Co., 1306 Hudson St., Hoboken, N. J.

Petersen, A. H., Mfg. Co., Milwaukee, Wis.

Pittsburgh Instrument & Machine Co., 40 Water St., Pittsburgh, Pa.

POOLE ENGINEERING & MACHINE CO., Woodberry, Baltimore, Md...*pp. 316, 317*

Potter, S. A. Tool & Machine Works, 79 E. 130th St., New York, N. Y.

Powdered Coal Engrg. & Equipment Co., 2415 Washington Blvd., Chicago, Ill.

Pratt Engineering & Machine Co., Atlanta, Ga.

Production Tool & Engrg. Co., 507 Jackson Blvd., Chicago, Ill.

PROVIDENCE ENGINEERING CORPN., Providence, R. I...*p. 12*

Richmond Metal Products Co., Inc., 5th & Arch Sts., Richmond, Va.

Riddell Bros. (Inc.), 340 Whitehall St., Atlanta, Ga.

RIEHLE BROS. TESTING MACHINE CO., 1424 N. 9th St., Philadelphia, Pa...*p. 268*

Robbins Gamwell & Co., 68 West St., Pittsfield, Mass.

Ruger, J. W. Mfg. Co., 222 Chicago, Ill., Buffalo, N. Y.

Russel Wheel & Foundry Co., Detroit, Mich.

Ryther & Pringle Co., Carthage, N. Y.

Schaeffer Machine Works, 35th & Grays Ferry Road, Philadelphia, Pa.

Security Tool Works, 115 S. Clinton St., Chicago, Ill.

Sheffield Machine & Tool Co., Dayton, Ohio

Shepherd Engineering Co., Williamsport, Pa.

*SMIDTH, F. L. & CO., 50 Church St., New York, N. Y...*p. 604*

Smithe, F. L. Machine Co., Inc, 150 Eleventh Ave., New York, N. Y.

Southworth Machine Co., Warren Ave., Portland, Maine

Spafford Tool Works, 10 Hoadley Place, Hartford, Conn.

STEACY-SCHMIDT MFG. CO., York, Pa... *p. 613*

Stecher, Charles Co. ,2801-13 North Knox Ave., Chicago, Ill.

Digitized by Google

Steel Products Engineering Co., Springfield, Ohio
Stoll, D. H. Co., 28 Lansing St., Buffalo, N. Y.
TORRINGTON MFG. CO., Torrington, Conn. ..*p. 641*
Turley Gear & Machine Co, 1505 N. 10th St., St. Louis, Mo.
Turner-Fricke Mfg. Co., Pittsburgh, Pa.
Ulmer, J. C. Co., 1791 E. 38th St., Cleveland, Ohio
UNION ENGINEERING CO., Cleveland, Ohio ..*p. 645*
Union Iron Works, Newark Ave. & Monroe St., Hoboken, N. J.
United States & Cuban Allied Works Engrg. Corpn., 50 Church St., New York, N. Y.
Walsh Press & Die Co., 4709 W. Kinzie St., Chicago, Ill.
Waltham Machine Works, Waltham, Mass.
Watts Campbell Co., 298 Ogden St., Newark, N. J.
Weiss, Louis T., 295 Taaffe Place, Brooklyn, N. Y.
Wilson, W. A. Machine Co., 217 N. Water St., Rochester, N. Y.
Wunsch & Washburn. McDougal St and Stone Ave., Brooklyn, N. Y.
Yoder Co., Walworth Ave. at W. 58th St., Cleveland, Ohio
York Electric & Machine Co., 30-34 N. Penn St., York, Pa.

SPEED REDUCING GEARS
(See Gears, Speed Reduction)

SPIKE MACHINES
Youngstown Foundry & Machine Co., Youngstown, Ohio

SPIRAL CONVEYORS
(See Conveyors, Screw)

SPOOLS, METAL
AMERICAN PULLEY CO., 4200 Wissahickon Ave., Philadelphia, Pa...*p. 322*

SPOT FACERS
Gairing Tool Co. (Inc.), 9 West Woodbridge St., Detroit, Mich.
Genesee Mfg. Co., Rochester, N. Y.

SPOT-SETTING MACHINES
Smith, F. H. Mfg. Co., 3037-3047 Carroll Ave., Chicago, Ill.

SPRAY COOLING SYSTEMS
Binks Spray Equipment Co., 3114-26 Carroll Ave., Chicago, Ill.
*COOLING TOWER CO., 15 John St., New York, N. Y...*p. 165*
*SPRAY ENGINEERING CO., 60 High St., Boston, Mass...*pp. 166, 167*

SPRAY NOZZLES
(See Nozzles, Spray)

SPRAYING MACHINERY
MacLeod Co., 2232 Bogen St., Cincinnati, O.

—Metal
K. & B. Co. (''Schoop''), 495 North 3rd St., Philadelphia, Pa.

—Paint
DeVilbiss Mfg. Co., 3754 Detroit Ave., Toledo, Ohio
FAIRBANKS-MORSE & CO., 900 S. Wabash Ave., Chicago, Ill...*p. 41*

SPRAYS

—Chemical and Industrial Purposes
ANTHONY COMPANY, 138 West Ave., Long Island City, N. Y...*p. 530*
Binks Spray Equipment Co., 3114-26 Carroll Ave., Chicago, Ill.
*SPRAY-ENGINEERING CO., 60 High St., Boston, Mass...*pp. 166, 167*

—Oil
ANTHONY COMPANY, 138 West Ave., Long Island City, N. Y...*p. 530*
*SPRAY ENGINEERING CO., 60 High St., Boston, Mass...*pp. 166, 167*

—Water
ANTHONY COMPANY, 138 West Ave., Long Island City, N. Y...*p. 530*
*SPRAY ENGINEERING CO., 60 High St., Boston, Mass...*pp. 166, 167*
*YARNALL-WARING CO. (''Yarway''), 7603-20 Queen St., Chestnut Hill, Philadelphia, Pa...*p. 196*

SPRING BALANCES
(See Balances, Spring)

SPRING MAKING MACHINES
Baird Machine Co., Bridgeport, Conn.
Sleeper & Hartley (Inc.), Worcester Mass.

SPRING TESTING MACHINES
OLSEN, TINIUS TESTING MACHINE CO., 500 N. 12th St., Philadelphia, Pa...*pp. 265, 266, 267*
RIEHLE BROS. TESTING MACHINE CO., 1424 N. 9th St., Philadelphia, Pa...*p. 268*

SPRINGS

—Brass
BARNES, WALLACE CO., Bristol, Conn... *p. 519*
*UNITED STATES METALLIC PACKING CO., 429 N. 13th St., Philadelphia, Pa... *p. 257*

—Car and Locomotive
American Steel Foundries, 332 S. Michigan Ave., Chicago, Ill.
Pittsburgh Spring & Steel Co., 1417 Farmers Bank Bldg., Pittsburgh, Pa.
Railway Steel Spring Co., 30 Church St., New York, N. Y.

—Clock and Phonograph
BARNES, WALLACE CO., Bristol, Conn... *p. 519*

—Clutch
BARNES, WALLACE CO., Bristol, Conn... *p. 519*

—Coiled
BARNES, WALLACE CO., Bristol, Conn... *p. 519*
Cook Spring Co., 420 E. 106th St., New York, N. Y.
Humason Mfg. Co., Forestville, Conn.
New York Wire & Spring Co., Hoboken, N. J.
Superior Machine Tool Co., Kokomo, Ind.
Union Spring & Mfg. Co., 1207 Fulton Bldg., Pittsburgh, Pa.

—Flat
BARNES, WALLACE CO., Bristol, Conn... *p. 519*
New York Wire & Spring Co., Hoboken, N. J.

—Machinery
BARNES, WALLACE CO., Bristol, Conn... *p. 519*
Cleveland Wire Spring Co., East 38th & Hamilton Ave., Cleveland, Ohio
New York Wire & Spring Co., Hoboken, N. J.
Pittsburgh Spring & Steel Co., 1417 Farmers Bank Bldg., Pittsburgh, Pa.
Raymond Mfg. Co. (Ltd.), Corry, Pa.
Union Spring & Mfg. Co., 1207 Fulton Bldg., Pittsburgh, Pa.

—Rubber
GOODRICH, B. F. RUBBER CO., Akron, Ohio...*pp. 258, 259*

—Steel
BARNES, WALLACE CO., Bristol, Conn... *p. 519*
Cary Spring Works, Inc., 240 W. 29th St., New York, N. Y.
Duer Spring & Mfg. Co., P. O. Box 1045, Pittsburgh, Pa.

Sp

Digitized by Google

SPRINGS (Continued)
Miller Wire Spring Co., Bridgeport, Conn.
New York Wire & Spring Co., P. O. Box 43, Uptown, Sta., Hoboken, N. J.
Pittsburgh Spring & Steel Co., 1417 Rarmers Bank Bldg., Pittsburgh, Pa.
*UNITED STATES METALLIC PACKING CO. 429 N. 13th St., Philadelphia, Pa... *p. 257*

—Torsion
BARNES, WALLACE CO., Bristol, Conn... *p. 519*
New York Wire & Spring Co., Hoboken, N. J.

—Vanadium
BARNES, WALLACE CO., Bristol, Conn... *p. 519*
Cook Spring Co., 420 E. 106th St., New York, N. Y.
Duer Spring & Mfg. Co., P. O. Box 1045, Pittsburgh, Pa.
New York Wire & Spring Co., P. O. Box 43, Uptown Sta., Hoboken, N. J.
Raymond Mfg. Co. (Ltd.), Corry, Pa.

—Vehicles (Leaf)
Detroit Steel Products Co., 2250 E. Grand Blvd., Detroit, Mich.
Liggett Spring & Axle Co., Monongahela, Pa.
Sheldon Axle & Spring Co., Wilkes-Barre, Pa.

—Wire
BARNES, WALLACE CO., Bristol, Conn... *p. 519*
Cook Spring Co., 420 E. 106th St., New York, N. Y.
Cuyahoga Spring Co., Waterloo Road, Cleveland, Ohio
Duer Spring & Mfg. Co., P. O. Box 1045, Pittsburgh, Pa.
Miller Wire Spring Co., Bridgeport, Conn.
New York Wire Spring Co., P. O. Box 43, Uptown Sta., Hoboken, N. J.
Raymond Mfg. Co. (Ltd.), Corry, Pa.

SPRINKLER SYSTEMS
Automatic Sprinkler Co. of America, 123 William St., New York, N. Y.
Globe Automatic Sprinkler Co., 2035 Washington Ave., Philadelphia, Pa.
Grinnell Co., Providence, R. I.
Rockwood Sprinkler Co. of Mass., 34-56 Harlow St., Worcester, Mass.

SPRINKLERS

—Automatic
Automatic Sprinkler Co. of America, 123 William St., New York, N. Y.
Globe Automatic Sprinkler Co., 2035 Washington Ave., Philadelphia, Pa.

—Spray
*SPRAY ENGINEERING CO. ("Spraco"), 60 High Street, Boston, Mass... *pp. 166, 167*

SPROCKETS
American High Speed Chain Co., 401 South Illinois St., Indianapolis, Ind.
AMERICAN TOOL & MACHINE CO., Boston 9, Mass... *p. 614*
Baldwin Chain & Mfg. Co., Worcester, Mass.
*CALDWELL, H. W. & SON CO., 17th St. & Western Ave., Chicago, Ill... *p. 370*
*CALDWELL, W. E. CO., 340 E. Brandeis St., Louisville, Ky... *p. 323*
Cedar Rapids Fdry. & Machine Co., 901-998 2nd Ave., Cedar Rapids, Iowa
Cullman Wheel Co., 1344 Altgeld St., Chicago, Ill.
*DIAMOND CHAIN & MFG. CO., Indianapolis, Ind... *p. 320*
DODGE SALES & ENGINEERING CO., Mishawaka, Ind... *pp. 42, 43, 326, 327, 328, 329*
*FOOTE BROS. GEAR & MACHINE CO., 213-21 N. Curtis St., Chicago, Ill... *pp. 308, 309*
*FULLER-LEHIGH CO., Fullerton, Pa... *p. 128*
Grant Gear Works, 151 Pearl St., Boston, Mass.
Havana Mfg. Co., Havana, Ill.
*HILL CLUTCH CO., Cleveland, Ohio... *p. 331*
JEFFREY MFG. CO., 904 N. 4th St., Columbus, Ohio... *pp. 376, 377*
*JONES, W. A. FOUNDRY & MACHINE CO., 4415 West Roosevelt Road, Chicago, Ill... *pp. 312, 313, 314, 315*
*MORSE CHAIN CO. Ithaca, N. Y... *p. 321*
Nilson-Miller Co., 1300-6 Hudson St., Hoboken, N. J.
Schultz, A. L. & Son, 1675 Elston St., Chicago, Ill.
Turley Gear & Machine Co., 1505 N. 10th St., St. Louis, Mo.
Union Chain & Mfg. Co., Seville, Ohio
WELLER MFG. CO., 1820-1856 N. Kostner Ave., Chicago, Ill... *p. 381*
Woburn Gear Works, Woburn, Mass.

SPUN SILK MACHINERY
FRANKLIN MACHINE CO., P. O. Address Box 1393, Providence, R. I... *p. 9*

SQUEEZERS (Foundry)
B. & B. Mfg. Co., P. O. Box 774, Indianapolis, Ind.

STACKS (Steel)
(See also Chimneys)
Abendroth, G. Irving Co., 10 E. 43rd St., New York, N. Y.
Acme Boiler & Tank Co., 48th & Morgan Sts., Chicago, Ill.
AMES IRON WORKS, Oswego, N. Y... *p. 4*
BASS FOUNDRY & MACHINE CO., Fort Wayne, Ind... *p. 57*
Bay City Iron Works, 1215-45 Harrison St., San Francisco, Cal.
*BIGELOW CO., 76 River St., New Haven, Conn... *p. 58*
Wm. Bros. Boiler & Mfg. Co., Minneapolis, Minn.
BROWNELL CO., Dayton, Ohio... *p. 59*
*CASEY-HEDGES CO., Chattanooga, Tenn. ..*pp. 60, 61*
Chicago Bridge & Iron Works, 2131 Old Colony Bldg., Chicago, Ill.
*COLE, R. D. MFG. CO., Newnan, Ga... *p. 63*
CONNERY & CO. (Inc.), 2nd & Luzerne Sts., Philadelphia, Pa... *p. 651*
Dover Boiler Works, 50 Church St., New York, N. Y.
Duff Patents Co. (Inc.), 918 Frick Bldg., Pittsburgh, Pa.
*ERIE CITY IRON WORKS, Erie, Pa... *pp. 66, 67*
FARRAR & TREFTS, Buffalo, N. Y... *p. 652*
Fleming Mfg. Co., New Castle, Pa.
FROST MFG. CO., 112 W. Adams St., Chicago, Ill... *pp. 68, 634*
Godfrey, Keeler Co, 70 Warren St., New York, N. Y.
*HEINE BOILER CO. ("Heine"), St. Louis, Mo... *pp. 70, 71*
*HENDRICK MFG. CO., Carbondale, Pa... *p. 653*
HOLMES, ROBT. & BROS. (Inc.), Danville, Ill... *pp. 386, 387*
HONHORST, JOS. CO., 1016-20 W. 6th St., Cincinnati, Ohio... *p. 654*
Kaw Boiler Works Co., Kansas City, Mo.
*KEELER, E. CO., Williamsport, Pa... *p. 69*
Kitloe Boiler & Tank Co. (Inc.), Canton, Ohio
KOVEN, L. O. & BROTHER, 154 Ogden Ave., Jersey City, N. J... *p. 605*
KROESCHELL BROS. CO., 460 West Erie St., Chicago, Ill... *p. 75*
LANCASTER IRON WORKS (Inc.), Lancaster, Pa... *pp. 656, 657*

Digitized by Google

LASKER IRON WORKS, 3201 So. Lincoln St., Chicago, Ill...*p. 655*
LEBANON BOILER WORKS (J. K. Petty & Co., Inc.), 6 So. 15th St., Philadelphia, Pa...*pp. 78, 79*
Leslie & Elliott Co., Cor. E. Railway & Iowa Ave., Paterson, N. J.
McAleenan Bros. Co., 25th & R. R Sts, Pittsburgh, Pa.
McDermott Engineering Co., Whitehall & Jordan Sts., Allentown, Pa.
McNaull Boiler Mfg. Co., Toledo, Ohio
McNeil, James & Bro. Co., Pittsburgh, Pa.
Meehan Boiler & Construction Co., Lowellville, Ohio
Michelmann Steel Construction Co., 121-141 N. Second St., Quincy, Ill.
Milwaukee Boiler Mfg. Co., 35th Ave. and National Ave., Milwaukee, Wis.
Munroe, R. & Sons, 23rd and Smallman Sts., Pittsburgh, Pa.
MURRAY IRON WORKS CO., Burlington, Iowa...*pp. 80, 81*
Muskegon Boiler Works, 18-22 Eighth St., Muskegon, Mich.
NEWBURGH STEAM BOILER WORKS (P. Delany & Co.), Newburgh, N. Y...*p. 64*
New Haven Boiler Works (Inc.), New Haven, Conn.
NEW YORK CENTRAL IRON WORKS CO. (Inc.), North Middleburg Road, Hagerstown, Md...*p. 659*
*O'BRIEN, JOHN BOILER WORKS CO., St. Louis, Mo...*p. 83*
Ohio Machine & Boiler Co., 1503 University St., Cleveland, Ohio
Pardel Corpn., Sheridan Bldg., 9th and Sansom Sts., Philadelphia, Pa.
Pennsylvania Boiler Works, 12th and Penn Ave., Erie, Pa.
Pyne Co., 927 Rupp St., Louisville, Ky.
Richmond Engineering Co., 937 Brook Ave., Richmond, Va.
Ruemmeli-Dawley Mfg. Co., 3900 Chouteau Ave., St. Louis, Mo.
*SCAIFE, WM. B. & SONS CO., Oakmont, Pa...*pp. 143, 660*
Sharpsville Boiler Works, Sharpsville, Pa.
Star Boiler Works, Clinton, Iowa
STEACY-SCHMIDT MFG. CO., York, Pa. *p. 612*
Tippett & Wood, 166 Howard St., Phillipsburg, N. J.
*TITUSVILLE IRON WORKS CO., Titusville, Pa...*p. 89*
Turl Iron & Car Co. (Inc.), 50 Broad St., New York, N. Y.
Union Boiler & Mfg. Co., Lebanon, Pa.
*UNION IRON WORKS, Erie, Pa...*p. 90*
*VOGT, HENRY MACHINE CO., Louisville, Ky...*pp. 92, 93*
*WALSH & WEIDNER BOILER CO., Chattanooga, Tenn...*p. 91*
Walton, C. & Son, 1221 W. Main St., Louisville, Ky.
Wholey Boiler Works, 95 Whipple St., Providence, R. I.
Wildex Co., Richmond, Ind.
Wilson Steam Boiler Co., 1919-27 S. 20th St., Omaha, Nebr.

STAIR TREADS
IRVING IRON WORKS CO. ("Safstep"), 3rd St. & Dutchkill Creek, Long Island City, N. Y...*p. 662*

—Rubber Composition
GOODRICH, B. F. RUBBER CO., Akron, Ohio...*pp. 258, 259*

STAMPINGS (Sheet Metal)
AMERICAN PULLEY CO., 4200 Wissahickon Ave., Philadelphia, Pa...*p. 322*
American Tube & Stamping Co., Bridgeport, Conn.
BARNES, WALLACE, CO., Bristol, Conn...*p. 519*
Bossert Corpn., Utica, N. Y.
Boston Pressed Metal Co., 175 Union St., Worcester, Mass.
Bridgeport Brass Co., Bridgeport, Conn.
Bridgeport Chain Co., 964 Crescent Ave., Bridgeport, Conn.
Bridgeport Metal Goods Mfg. Co., Cherry St., Bridgeport, Conn.
Bristol Brass Co., Bristol, Conn.
Circle Stamping & Mfg. Co., 245 Cortland St., Belleville, N. J.
Cleveland Metal Products Co., 7609 Platt Ave., Cleveland, Ohio
Cleveland Wrought Products Co., 3950 West 58th St., Cleveland, Ohio
Coleman Fare Box Co., 1191 Bathurst St., Toronto, Canada
Craig Mfg. Co., Cedar Rapids, Iowa.
Cuyahoga Spring Co., Waterloo Road, Cleveland, Ohio
Detroit Pressed Steel Co., 6660 Mt. Elliot Ave., Detroit, Mich.
Foster, Merriam & Co., Meridan, Conn.
Gem Mfg. Co., 1229-43 Goebel St., N. S., Pittsburgh, Pa.
Gem Stopper Co., 2120 Nicholas St., Philadelphia, Pa.
GEUDER, PAESCHKE & FREY CO. ("G. P. & F"), Western Valley, Milwaukee, Wis...*p. 434*
Globe Mach. & Stamping Co., 1254 W. 76th St., Cleveland, Ohio
Great Lake Forge Co., 14 E. Jackson Blvd., Chicago, Ill.
Janney, Steinmetz & Co., 1421 Chestnut St., Philadelphia, Pa.
KEY BOILER EQUIPMENT CO., 27th & McCasland Ave., East St. Louis, Ill...*pp. 100, 101*
Lansing Stamping Co., Lansing, Mich.
McKinney Mfg. Co., Pittsburgh, Pa.
Mason, Jos. M. Maching Co. (Inc.), 2305-13 N. Marshall St., Philadelphia, Pa.
Mathews Mfg. Co., 104 Gold St., Worcester, Mass.
Meyers, W. F. Co., Bedford, Ind.
Mossberg, Frank Co., Lamb Street, Attleboro, Mass.
Parish Mfg. Co., 7th & Chestnut Sts. Reading, Pa.
Parker White-Metal & Machine Co., 23rd & Penna. Ave., Erie, Pa.
Ramsdell Specialty Co., W. Boylston St., Worcester, Mass.
*REED & PRINCE MFG. CO., Worcester, Mass...*p. 524*
Richmond Metal Products Co., Inc., 5th & Arch Sts., Richmond, Va.
Risdon Mfg. Co., Naugatuck, Conn.
Robbins Gamwell & Co., 68 West St., Pittsfield, Mass.
Robinson Tool Works (Inc.), Baldwin St. & Kelsey St., Waterbury, Conn.
Rockwood Sprinkler Co. of Mass., 34-56 Harlow St., Worcester, Mass.
Root, C. J. Co., Bristol, Conn.
Security Tool Works, 115 S. Clinton St., Chicago, Ill.
TRANSUE & WILLIAMS STEEL FORGING CORPN., Alliance, Ohio...*p. 432*
Worcester Pressed Steel Co., Worcester, Mass.
Worcester Stamped Metal Co., 9 Hunt St., Worcester, Mass.
Zenite Metal Co., Indianapolis, Ind.

STAMPS AND DIES (Steel)
HOGGSON & PETTIS MFG. CO., New Haven Conn...*pp. 512, 513, 514*
Mathews, Jas. H. & Co., 3942 Forbes St., Pittsburgh, Pa.

St

Digitized by Google

STAMP AND DIES (Continued)
NOBLE & WESTBROOK MFG. CO., Hartford, Co...*p. 494*
Pannier Bros. Stamp Co. (Inc.), 209 Sandusky St., Pittsburgh, Pa.

STANDPIPES
*CASEY-HEDGES CO., Chattanooga, Tenn. ..*pp. 60, 61*
*COLE, R. D. MFG. CO., Newman, Ga...*p. 63*
CONNERY & CO. (Inc.), 2nd and Luzerne Sts., Philadelphia, Pa...*p. 651*
FAIRBANKS, MORSE & CO., 900 S. Wabash Ave., Chicago, Ill...*p. 41*
LANCASTER IRON WORKS (Inc.), Lancaster, Pa...*pp. 656, 657*
LASKER IRON WORKS, 3201 So. Lincoln St., Chicago, Ill...*p. 655*
LEBANON BOILER WORKS (J. K. Petty & Co., Inc.), 6 So. 15th St., Philadelphia, Pa...*pp. 78, 79*
NEW YORK CENTRAL IRON WORKS CO. (Inc.), North Middleburg Road, Hagerstown, Md...*p. 659*
*PITTSBURGH VALVE, FOUNDRY & CONSTRUCTION CO. ("Gulland"), P. O. Box 1016, Pittsburgh, Pa...*pp. 192, 193*
Tippett & Wood, 166 Howard St., Phillipsburg, N. J.
*WALSH & WEIDNER BOILER CO., Chattanooga, Tenn...*p. 91*

—Concrete
Heine Chimney Co., 123 W. Madison St., Chicago, Ill.

STANDS (Tool)
Lupton's David Sons Co., Allegheny Ave. & Tulip St., Philadelphia, Pa.

STARCH MAKING MACHINERY
Remmers, B. & Sons, 1227 Germantown Ave. Philadelphia, Pa.

STAYBOLTS
Falls Hollow Staybolt Co., 21 E. Portage St., Cuyahoga Falls, Ohio
Flannery Bolt Co. ("Tate"), Vanadium Bldg., Pittsburgh, Pa.

STAYBOLTS (Hollow)
Falls Hollow Staybolt Co., 21 E. Portage St., Cuyahoga Falls, Ohio

STEAM ENGINES, SEPARATORS, SHOVELS, TRAPS, Etc.
(See Engines, Separators, Shovels, Traps, Etc., Steam)

STEAM JETS (Smoke Preventers)
KROESCHELL BROS. CO., 460 West Erie St., Chicago, Ill...*p. 75*

STEAM SHOVEL PARTS
American Manganese Steel Co., Chicago, Heights, Ill.

STEAM SPECIALTIES
AMERICAN INJECTOR CO., Detroit, Mich. ..*p. 217*
Berry Engineering Co., Chester, Pa.
Burrows Mfg. Co., 41-43 N. Water St., York, Pa.
CASH, A. W. CO., Decatur, Ill...*p. 205*
D'ESTE, JULIAN CO., 26 Canal St., Boston, Mass...*pp. 206, 207*
FOSTER ENGINEERING CO., Newark, N. J. ..*p. 209*
FULTON CO., ("Sylphon"), Knoxville, Tenn...*pp. 218, 219*
Golden-Anderson Valve Specialty Co., 1228 Fulton Bldg., Pittsburgh, Pa.
Griscom-Russell Co., 90 West St., New York, N. Y.
*H. S. B. W. COCHRANE CORPN., Philadelphia, Pa...*pp. 146, 147*
Hennebohle, F. Co., 81st St. & S. Chicago Ave, St. Chicago, Ill.
*ILLINOIS ENGINEERING CO. ("Eclipse"), Chicago, Ill...*pp. 210, 211*
*JOHNS-MANVILLE (Inc.), New York, N. Y...*p.244*
*KIELEY & MUELLER (Inc.), ("Kieley"), 34 W. 13th St., New York, N. Y...*p. 212*
LESLIE CO., Lyndhurst, N. J...*p. 213*
*LUNKENHEIMER CO., Cincinnati, Ohio... *pp. 184, 185, 186, 187, 188, 189*
McAlear Mfg. Co., 1901 S. Western Ave., Chicago, Ill.
Nightingale & Childs Co., 205 Congress St., Boston, Mass.
OPEN COIL HEATER & PURIFIER CO., Indianapolis, Ind...*p. 149*
Pitts & Kitte Mfg. & Supply Co., 50 Park Place, New York, N. Y.
Ross Valve Mfg. Co., 4 Oakland Ave., Troy, N. Y.
Sterling Products Co. (Inc.), Harvard Sq., Cambridge, Mass.
Watts Regulator Co., 250-252 Lowell St., Lawrence, Mass.

STEEL
—Alloy
Aborn Steel Co. (Inc.), 22 Clarke St., New York, N. Y.
ANDREWS STEEL CO., Newport, Ky...*p. 421*
ATLAS CRUCIBLE STEEL CO., Hanna Bldg., Cleveland, Ohio...*p. 422*
Becker Steel Co. of America (Inc.), 154 Nassau St., New York, N. Y.
Camden Forge Co., Mt. Ephraim Ave., Camden, N. J.
Cann & Saul Steel Co.. 516 Commerce St., Philadelphia, Pa.
Carpenter Steel Co., Reading, Pa.
Climax Molybdenum Co., 61 Broadway, New York, N. Y.
Cyclops Steel Co. (Inc.), 120 Broadway, New York, N. Y.
Denman & Davis, 93-99 Lafayette St., New York, N. Y.
Electric Steel & Forge Co., 6609 Grant Ave., Cleveland, Ohio.
Federal Tool & Alloy Steel Corpn., 62-76 Rutledge St., Brooklyn, N. Y.
Halcomb Steel Co., Syracuse, N. Y.
Hammond Steel Co (Inc.) 2600 Milton Ave., Syracuse, N. Y.
Hess Steel Corpn., East Ave. & P. R. R., Baltimore, Md.
Interstate Iron & Steel Co., 104 S. Michigan Ave., Chicago, Ill.
Poldi Steel Corporation of America, 115 Broadway, New York, N. Y.
*SIMONDS MFG. CO., Fitchburg, Mass... *p. 507*
Union Electric Steel Co., Carnegie, Pa.
United Alloy Steel Corpn., Canton, Ohio
Vulcan Crucible Steel Co. ("Vulcan"), Aliquippa, Pa.
Wheelock, Lovejoy & Co., 128 Sidney St., Cambridge, Mass.

—Alloy (Cold Drawn)
Lancaster Steel Products Co., Lancaster, Pa.
Pittsburgh Tool Steel Wire Co., Monaco, Pa.
*UNION DRAWN STEEL CO., Beaver Falls, Pa...*p. 423*

—Bar
ANDREWS STEEL CO., Newport, Ky...*p. 421*
Cann & Saul Steel Co., 516 Commerce St., Philadelphia, Pa.
Illinois Steel Co., 208 S. La Salle St., Chicago, Ill.
Interstate Iron & Steel Co., 104 S. Michigan Ave., Chicago, Ill.
Lockart Iron & Steel Co., Pittsburgh, Pa.

Digitized by Google

Pardee, C. Works, Perth Amboy. N. J.
*SIMONDS MFG. CO., Fitchburg, Mass... *p. 507*

—Chrome
ANDREWS STEEL CO., Newport, Ky...*p. 421*

—Chrome Nickel
ANDREWS STEEL CO., Newport, Ky...*p. 421*
Frasse, Peter A. & Co., 417 Canal St., New York, N. Y.
*UNION DRAWN STEEL CO., Beaver Falls, Pa...*p. 423*

—Chrome Vanadium
ANDREWS STEEL CO., Newport, Ky...*p. 421*
Lindenberg Steel Co., 90 West St., New York, N. Y.
*UNION DRAWN STEEL CO., Beaver Falls, Pa...*p. 423*
Union Steel Casting Co., 62nd & Butler Sts., Pittsburgh, Pa.

—Chromium Alloy
American Stainless Steel Co., 1541 Oliver Bldg., Pittsburgh, Pa.

—Cold Drawn
Blum, Julius & Co., 532-40 W. 22nd St., New York, N. Y.
Dickey Steel Co. (Inc.), 233 Broadway, New York, N. Y.
Electric Steel & Forge Co., 6609 Grant Ave., Cleveland, Ohio
Fitzsimmons Co., Youngstown, Ohio
Kidd Drawn Steel Co., Aliquippa, Pa.
Lancaster Steel Products Corpn., Lancaster, Pa.
Moltrup Steel Products Co., Beaver Falls, Pa.
New England Drawn Steel Co., Mansfield, Mass.
Purdy, A. R. Co. (Inc.), 127 Christopher St., New York, N. Y.
Standard Gauge Steel Co., Beaver Falls, Pa.
*UNION DRAWN STEEL CO., Beaver Falls, Pa...*p. 423*
Ward's Edgar T. Sons Co., 50 Farnsworth St., Boston, Mass.

—Cold Rolled
Bliss & Laughlin (Inc.), Harvey, Ill.
Carpenter Steel Co., Reading, Pa.
Hercules Electric Steel Corpn., 137 Lafayette St., New York, N. Y.
*UNION DRAWN STEEL CO., Beaver Falls, Pa...*p. 423*

—Crucible
ATLAS CRUCIBLE STEEL CO., Hanna Bldg., Cleveland, Ohio...*p. 422*
Braelburn Steel Co., 366 Madison Ave., New York, N. Y.
Century Steel Co. of America, Poughkeepsie, N. Y.
McInnes Steel Co. (Ltd.), Corry, Pa.
*SIMONDS MFG. CO., Fitchburg, Mass...*p. 507*

Crucible (Cold Drawn)
*UNION DRAWN STEEL CO., Beaver Falls, Pa...*p. 423*

—Electric Furnace
Braeburn Steel Co., 366 Madison Ave., New York, N. Y.
Electro Steel Co. (Inc.), 206 Jones Bldg., Pittsburgh, Pa.
Gerlinger Steel Castings Co., Milwaukee, Wis.
Hess Steel Corpn., East Ave. & P. R. R., Baltimore, Md.
Ludlum Steel Co., 2 Rector St., New York, N. Y.
*SIMONDS MFG. CO., Fitchburg, Mass... *p. 507*
*UNION DRAWN STEEL CO., Beaver Falls, Pa...*p. 423*
Union Electric Steel Co., Carnegie, Pa.
United Alloy Steel Corpn., Canton, Ohio

—High Speed
Aborn Steel Co. (Inc.), 22 Clarke St., New York, N. Y.
Allen, Edgar & Co. (Ltd.), 718-22 West Lake St., Chicago, Ill.
Andrew, Jno. Hy. & Co. (Ltd.), 26 Cortlandt St., New York, N. Y.
ANDREWS STEEL CO., Newport, Ky...*p. 421*
Apex Steel Corpn., 50 Church St., New York, N. Y.
ATLAS CRUCIBLE STEEL CO., Hanna Bldg., Cleveland, Ohio...*p. 422*
Becker Steel Co. of America (Inc.), 154 Nassau St., New York, N. Y.
Century Steel Co. of America, Poughkeepsie, N. Y.
Colonial Steel Co., 324 4th Ave., Pittsburgh, Pa.
Columbia Tool Steel Co. ("Clarite"), Chicago Heights, Ill.
Cyclops Steel Co., 120 Boradway, New York, N. Y.
Denman & Davis, 93-99 Lafayette St., New York, N. Y.
Dickey Steel Co. (Inc.), 233 Broadway, New York, N. Y.
Firth-Sterling Steel Co., McKeesport, Pa.
Hobson, Houghton & Co. (Ltd.), 83 Beekman St., New York, N. Y.
Jessop, Wm. & Sons (Inc.), 91 John St., New York, N. Y.
Lindenberg Steel Co., 90 West St., New York, N. Y.
Ludlum Steel Co., 2 Rector St. New York, N. Y.
McInnes Steel Co. (Ltd.), Corry, Pa.
Poldi Steel Corporation of America, 115 Broadway, New York, N. Y.
Vanadium Alloys Steel Co. ("Red Cut Superior"), Latrobe, Pa.
Vulcan Crucible Steel Co. ("Wolfram"), Aliquippa, Pa.
Ward's, Edgar T. Sons Co., 50 Farnsworth St., Boston, Mass.

—Magnet
ATLAS CRUCIBLE STEEL CO., Hanna Bldg., Cleveland, Ohio...*p. 422*

—Manganese
American Manganese Steel Co., Chicago, Heights, Ill.
Taylor-Wharton Iron & Steel Co., High Bridge, N. J.

—Nickel
Andrew, Jno. Hy. & Co. (Ltd.), 26 Cortlandt St., New York, N. Y.
ANDREWS STEEL CO., Newport, Ky...*p. 421*

—Non-Corrosive
American Stainless Steel Co., 1541 Oliver St., Pittsburgh, Pa.

—Open Hearth
Atlas Steel Casting Co., 1963 Elmwood Ave., Buffalo, N. Y.
Braddock Mfg. Co., Braddock, Pa.
FALK CORPORATION, Milwaukee, Wis... *pp. 304, 305*
Pittsburgh Steel Co., Union Arcade Bldg., Pittsburgh, Pa.
United Alloy Steel Corpn., Canton, Ohio

—Open Hearth (Cold Drawn)
Columbia Steel & Shafting Co., Pittsburgh, Pa.
Compressed Steel Shafting Co., 1587 Hyde Park Ave., Readville, Boston 37, Mass.
*UNION DRAWN STEEL CO., Beaver Falls, Pa...*p. 423*

—Rock Drill
Colonial Steel Co., 324 Fourth Ave., Pittsburgh, Pa.

St

Digitized by Google

STEAM SPECIALTIES (Continued)
*INGERSOLL-RAND CO., 11 Broadway, New York, N. Y...*pp. 546, 547*
International High Speed Steel Co., (''Bulldog''), 99 Nassau St., New York, N. Y.

—Shim
BARNES, WALLACE CO., Bristol, Conn... *p. 519*

—Spring
Interstate Iron & Steel Co., 104 S. Michigan Ave., Chicago, Ill.
National Lock Washer Co., Newark, N. J.
Purdy, A. R. Co. (Inc.), 127 Christopher St., New York, N. Y.
Wyoming Shovel Works, Wyoming, Pa.

—Spring (Cold Rolled)
BARNES, WALLACE CO., Bristol, Conn... *p. 519*
Haring, Ellsworth, 114-118 Liberty St., New York, N. Y.

—Stainless
American Stainless Steel Co., 1541 Oliver Bldg., Pittsburgh, Pa.

—Strip
American Tube & Stamping Co., Bridgeport, Conn.
Blum, Julius & Co., 532-40 W. 22nd St., New York, N. Y.
Central Steel & Wire Co., 119 N. Peoria St., Chicago, Ill.
Hercules Electric Steel Corpn., 137 Lafayette St., New York, N. Y.
Lancaster Steel Products Corpn., Lancaster, Pa.
Worcester Pressed Steel Co., Worcester, Mass.

—Strip (Hot Rolled)
American Tube & Stamping Co., Bridgeport, Conn.
Worcester Pressed Steel Co., Worcester, Mass.

—Strip (Tempered and Blued)
BARNES, WALLACE CO., Bristol, Conn... *p. 519*

—Structural
Bergen Point Iron Works, West 5th St., Bayonne, N. J.
Cincinnati Iron & Steel Co., Cincinnati, Ohio
Continental Bridge Co., Peotone, Ill.
Illinois Steel Co., 208 S. La Salle St., Chicago, Ill.
Inland Steel Co., 1105 First Natl. Bank Bldg., Chicago, Ill.
Jones & Laughlin Steel Co., 3rd Ave. & Ross St., Pittsburgh, Pa.
Minneapolis Steel & Machinery Co., 29th & Minnehaha Ave., Minneapolis, Minn.
Rownson Drew & Clydesdale (Inc.), 68 William St., New York, N. Y.
Ryerson, Joseph T. & Son, 16th & Rockwell Sts., Chicago, Ill.

—Tool
Allen, Edgar & Co. (Ltd.), 718-22 West Lake St., Chicago, Ill.
Andrew, Jno. Hy. & Co. (Ltd.), 26 Cortlandt St., New York, N. Y.
Apex Steel Corpn., 50 Church St., New York, N. Y.
ANDREWS STEEL CO., Newport, Ky...*p. 421*
ATLAS CRUCIBLE STEEL CO., Hanna Bldg., Cleveland, Ohio...*p. 422*
Becker Steel Co. of America (Inc.), 154 Nassau St., New York, N. Y.
Bethlehem Steel Co., Bethlehem, Pa.
Cann & Saul Steel Co., 516 Commerce St., Philadelphia, Pa.
Carpenter Steel Co., Reading, Pa.
Century Steel Co. of America, Poughkeepsie, N. Y.
Colonial Steel Co., 324 4th Ave., Pittsburgh, Pa.
Columbia Tool Steel Co. (''Oildie''), Chicago Heights, Ill.
Cyclops Steel Co., 120 Broadway, New York, N. Y
Denman & Davis, 93-99 Lafayette St., New York, N. Y.
Dickey Steel Co. (Inc.), 233 Broadway, New York, N. Y.
Electro Steel Co. (Inc.), 206 Jones Bldg., Pittsburgh, Pa.
Electric Steel & Forge Co., 6609 Grant Ave., Cleveland, Ohio
Federal Tool & Alloy Steel Corpn., 62-76 Rutledge St., Brooklyn, N. Y.
Firth-Sterling Steel Co., McKeesport, Pa.
Frasse, Peter A. & Co., 417 Canal St., New York, N. Y.
Halcomb Steel Co., Syracuse, N. Y.
Hammond Steel Co. (Inc.), 2600 Milton Ave., Syracuse, N. Y.
Haring, Ellsworth, 114-118 Liberty St., New York, N. Y.
Hercules Electric Steel Corpn., 137 Lafayette St., New York, N. Y.
Hess Steel Corpn., East Ave. & P. R. R., Baltimore, Md
Hobson, Houghton & Co. (Ltd.), 83 Beekman St., New York, N. Y.
International High Speed Steel Co., (''International''), 99 Nassau St., New York, N.Y.
Jessop, Wm. & Sons (Inc.), 91 John St., New York, N. Y.
Kidd Drawn Steel Co., Aliquippa, Pa.
Lindenberg Steel Co., 90 West St., New York, N. Y.
Ludlum Steel Co., 2 Rector St., New York, N. Y.
Midvale Steel & Ordnance Co., Cambria Steel Co., Widener Bldg., Philadelphia, Pa.
Pittsburgh Tool Steel Wire Co., Monaca, Pa.
Poldi Steel Corporation of America, 115 Broadway, New York, N. Y.
Purdy, A. R. Co. (Inc.), 127 Christopher St., New York, N. Y.
Ryerson, Joseph T. & Son 16th & Rockwell Sts., Chicago, Ill.
Vanadium-Alloys Steel Co., Latrobe, Pa.
Vulcan Crucible Steel Co., (''Vulcan''), Aliquippa, Pa.
Ward's Edgar T. Sons Co., 50 Farnsworth St., Boston, Mass.

—Vanadium
ANDREWS STEEL CO., Newport, Ky...*p. 421*
Union Steel Casting Co., 62nd & Butler Sts., Pittsburgh, Pa.

STEEL BARS, BILLETS, BLOOMS, DISCS, SLABS, SHEETS, Etc.
(See Bars, Billets, Blooms, Discs, Slabs, Sheets, Steel, etc.)

STEEL PLATE CONSTRUCTION
*ALLIS-CHALMERS MFG. CO., Milwaukee, Wis...*pp. 28, 29*
Bartlett-Hayward Co., Baltimore, Md.
BASS FOUNDRY & MACHINE CO., Fort Wayne, Ind...*p. 57*
Bergen Point Iron Works, West 5th St., Bayonne, N. J.
*BIGELOW CO., 76 River St., New Haven, Conn...*p. 58*
BIGGS BOILER WORKS CO., Case Ave. & Newton St., Akron, Ohio...*p. 650*
Blaw-Knox Co., P. O. Box 915, Pittsburgh, Pa.
Borger Bros., 257 W. Spring St., Columbus, O
BROWNELL CO., Dayton, Ohio...*p. 59*
Burhorn, Edwin Co., 25 West Broadway, New York, N. Y.
Burr Co., Champaign, Ill.
*CALDWELL, W. E., 340 E. Brandeis St., Louisville, Ky...*p. 323*

Digitized by Google

Carroll-Porter Boiler & Tank Co., Pittsburgh, Pa.
Chicago Bridge & Iron Works, 2131 Old Colony Bldg., Chicago, Ill.
COATESVILLE BOILER WORKS, Coatesville, Pa...*p. 62*
*COLE, R. D. MFG. CO., Newnan, Ga. *p. 63*
CONNERY & CO. (Inc.), 2nd & Luzerne Sts., Philadelphia, Pa...*p. 651*
Cunningham, Christopher Co., Greenpoint Ave. & Newton Creek, Brooklyn, N. Y.
Dover Boiler Works, 50 Church St., New York, N. Y.
Duff Patents Co. (Inc.), 918 Frick Bldg., Pittsburgh, Pa.
Electric Welding Co. of America, 764 Court St., Brooklyn, N. Y.
*ERIE CITY IRON WORKS, Erie, Pa... *pp. 66 67*
Fleming Mfg. Co., New Castle, Pa.
FROST MFG. Co., 112 W. Adams St., Chicago, Ill...*pp. 68, 634*
Gerdes Co. (Inc.), 30 Church St., New York, N. Y.
Gillespie Mfg. Corpn., 12th & Monmouth Sts., Jersey City, N. J.
Hammond Iron Works, Warren, Pa.
*HEINE BOILER CO. (''Heine''), St. Louis, Mo...*pp. 70, 71*
*HENDRICK MFG. CO., Carbondale, Pa... *p. 653*
HOLMES, ROBT. & BROS. (Inc.), Danville, Ill...*pp. 386, 387*
HONHORST, JOS. CO., 1016-20 W. 6th St., Cincinnati, Ohio...*p. 654*
INTERNATIONAL ENGINEERING WORKS (Inc.), Framingham, Mass...*pp. 72, 73*
*KEELER, E. CO., Williamsport, Pa...*p. 69*
KEWANEE BOILER CO., Kewanee, Ill... *pp. 622, 623, 624*
Kittoe Boiler & Tank Co. (Inc.), Canton, O.
KOVEN, L. O. & BRO., 154 Ogden Ave., Jersey City, N. J...*p. 605*
LANCASTER IRON WORKS (Inc.), Lancaster, Pa...*pp. 656, 657*
LASKER IRON WORKS, 3201 S. Lincoln St., Chicago, Ill...*p. 655*
LEBANON BOILER WORKS (J. K. Petty & Co., Inc.), 6 So. 15th St., Philadelphia, Pa. ..*pp. 78, 79*
Lookout Boiler & Mfg. Co., Chattanooga, Tenn.
McAleenan Bros. Co., 25th & R. R. Sts., Pittsburgh, Pa.
McNeil, James & Bro. Co., 29th St. & A. V. R. R., Pittsburgh, Pa.
Meehan Boiler & Construction Co., Lowellville, Ohio
Milwaukee Boiler Mfg. Co., 35 Ave. & National Ave., Milwaukee, Wis.
MILWAUKEE RELIANCE BOILER WORKS, Milwaukee, Wis...*p. 148*
Mohr, John & Sons, 96th St. & Calumet River, Chicago, Ill.
NEWBURGH STEAM BOILER WORKS (P. Delany & Co.), Newburgh, N. Y...*p. 64*
New Haven Boiler Works (Inc.), New Haven, Conn.
Northern Blower Co., W. 65th & Dennison Ave., Cleveland, Ohio
Ohio Machine & Boiler Co., 1503 University St., Cleveland, Ohio
Pollock, Wm. B. Co., Youngstown, Ohio
Prospect Boiler Co., Ward St. & Raritan River R. R., New Brunswick, N. J.
Riter-Conley Co., Oliver Bldg., Pittsburgh, Pa.
Ruemmeli-Dawley Mfg. Co., 3900 Chouteau Ave., St. Louis, Mo.
SMITH, SAMUEL & SON CO., Paterson, N. J...p. 88
Struthers-Wells Co., Warren, Pa.
Thorn, J. S. Co., 20th & Allegheny Ave., Philadelphia, Pa.
*TITUSVILLE IRON WORKS CO., Titusville, Pa...*p. 89*
Treadwell Const. Co., Midland, Pa.
Turl Iron & Car Co. (Inc.), 50 Broad St., New York, N. Y.
Union Boiler & Mfg. Co., Lebanon, Pa.
*UNION IRON WORKS, Erie, Pa...*p. 90*
*WALSH & WEIDNER BOILER CO., Chattanooga, Tenn...*p. 91*
Walsh's Holyoke Steam Boiler Works, Holyoke, Mass.
Warren City Tank & Boiler Co., Warren, O.

STEEL TEMPERING (Refrigeration)
Phoenix Ice Machine Co., 2711 Church St., Cleveland, Ohio

STEEL TESTING APPARATUS
BROWN INSTRUMENT CO. (''Brown''), Philadelphia, Pa...*p. 292*
Holz & Co. (Inc.), 17 Madison Ave., New York, N. Y.

STEEL TREATING
Connecticut Metal Treating Co. (Inc.), 207 Knowelton St., Bridgeport, Conn.
WILLIAMS, J. H. & CO., 70 Richards St., Brooklyn, N. Y...*p. 517*

STEEL WORKS EQUIPMENT
Blair Engineering Co, 17 Battery Place, New York, N. Y.
Diamond Machine Co., Monongahela, Pa.
Mackintosh-Hemphill Co., 12th & Etna Sts., Pittsburgh, Pa.
Phoenix Iron Works Co., Meadville, Pa.

STELLITE
Haynes Stellite Co., 30 East 42nd St., New York, N. Y.

STEPS, LADDER & STAIR
IRVING IRON WORKS CO. (''Safstep'') 3rd St. & Dutchkill Creek, Long Island City, N. Y...*p. 662*

STERILIZERS
CLOW, JAMES B. & SONS (''R. U. V.''), 534 So. Franklin St., Chicago, Ill...*pp. 230, 231*
KOVEN, L. O. & BRO., 154 Ogden Ave., Jersey City, N. J...*p. 605*
R. U. V. Co. (Inc.), 165 Broadway, New York, N. Y.

STILLS
*CASEY-HEDGES CO., Chattanooga, Tenn. ..*pp. 60, 61*
DEVINE, J. P. CO., 1375 Clinton St., Buffalo, N. Y...*pp. 606, 607*
Furman-Fisher Corpn., 30 Church St., New York, N. Y.
*KEELER, E. CO., Williamsport, Pa...*p. 69*
LASKER IRON WORKS, 3201 So. Lincoln St., Chicago, Ill...*p. 655*
LEBANON BOILER WORKS (J. K. Petty & Co., Inc.), 6 So. 15th St., Philadelphia, Pa...*pp. 78, 79*
NEW YORK CENTRAL IRON WORKS CO. (Inc.), North Middleburg Road, Hagerstown, Md...*p. 659*
*TITUSVILLE IRON WORKS CO., Titusville, Pa...*p. 89*

—Acid
FARRAR & TREFTS, Buffalo, N. Y...*p. 652*
Harris, Arthur & Co., 212 Curtis St., Chicago, Ill.
LASKER IRON WORKS, 3201 So. Lincoln St., Chicago, Ill...*p. 655*

—Ammonia
Western Gas Construction Co., Fort Wayne, Ind.

St

Digitized by Google

STILLS (Continued)
—Gasoline
Bousman Mfg. Co. (Inc.), 1153-57 Plainfield Ave., N. E., Grand Rapids, Mich.
LASKER IRON WORKS, 3201 So. Lincoln St., Chicago, Ill...*p. 655*

—Hydrogen Water
ELECTROLABS CO., Pittsburgh, Pa...*p. 536*

—Tar
CONNERY & CO. (Inc.), 2nd and Luzerne Sts., Philadelphia, Pa...*p. 651*
KOVEN, L. O. & BRO., 154 Ogden Ave., Jersey City, N. J...*p. 605*
McAleenan Bros. Co., 25th & R. R. Sts., Pittsburgh, Pa.
*U. S. CAST IRON PIPE & FOUNDRY CO., Burlington, N. J...*pp. 232, 233*

—Water
CONNERY & CO. (Inc.), 2nd & Luzerne Sts., Philadelphia, Pa...*p. 651*
ELECTROLABS CO., Pittsburgh, Pa...*p. 536*
Hodges Water Still Co. (Inc.), 5713 Appletree St., Philadelphia, Pa.
Jewell Polar Co. ("Polarstil"), 567 W. Van Buren St., Chicago, Ill.
KOVEN, L. O. & BRO., 154 Ogden Ave., Jersey City, N. J...*p. 605*
STANDARD WATER SYSTEMS CO. ("Tripure"), Hampton, N. J...*p. 144*
*U. S. CAST IRON PIPE & FOUNDRY CO., Burlington, N. J...*pp. 232, 233*

—Welded
Kellogg, M. W. Co., 90 West St., New York, N. Y.

STOCKS AND DIES
Borden Co. ("Beaver"), Warren, Ohio
Carpenter, J. M. Tap & Die Co., Pawtucket, R. I.
Hart Mfg. Co., 2815 E. 20th St., Cleveland, Ohio
Oster Mfg. Co., 2057 E. 61st Place, Cleveland, Ohio
Pottstown Machine Co., Pottstown, Pa.
PRATT & WHITNEY CO., 111 Broadway, New York, N. Y...*p. 471*
Reed Mfg. Co., Erie, Pa.
Toledo Pipe Threading Machine Co. ("Toledo"), 1445 Summit St., Toledo, Ohio
Winter Brothers Co., Wrentham, Mass.

STOKER CONTROL SYSTEMS
*ENGINEER CO. ("Balanced Draft"), 17 Battery Place, New York, N. Y...*pp. 108, 109*

STOKERS
—Chain Grate
AUTOMATIC FURNACE CO. ("Model Chicago"), Dayton, Ohio...*pp. 112, 113*
*BABCOCK & WILCOX CO., 85 Liberty St., New York, N. Y...*pp. 52, 53, 54, 45*
Babcock & Wilcox (Ltd.), College St., St. Henry, Montreal, Canada
Brady, James A. Foundry Co. ("Harrington"), 45th St. & Western Blvd., Chicago, Ill.
Burke Furnace Co., 223 W. Austin Ave., Chicago, Ill.
Crowe, Paul L., 33 Bidwell Ave., Jersey City, N. J.
FLYNN & EMRICH CO. ("Huber"), Baltimore, Md...*p. 121*
Green Engineering Co., East Chicago, Ind.
*ILLINOIS STOKER CO. ("Illinois"), Alton, Ill...*p. 117*
Laclede-Christy Clay Products Co., 1673 Ry. Exchange Bldg., St. Louis, Mo.
Rosedale Fndry. & Mach. Co. ("Playford"), Columbus & Preble Aves., North Side, Pittsburgh, Pa.
Superheater & Engineering Co., 1816 Woolworth Bldg., New York, N. Y.
*WESTINGHOUSE ELECTRIC & MFG. CO., East Pittsburgh, Pa...*pp. 160, 161*

—Hand Operated
Armstrong Mfg. Co., Springfield, Ohio
Combustion Engineering Corpn. ("Perfection"), Broad St., New York, N. Y.
*FILES ENGINEERING CO (Inc.), Providence, R. I...*p. 122*
FLYNN & EMRICH CO. ("Huber"), Baltimore, Md...*p. 121*
G. M. C. Engineering Co., Graphic Arts Bldg., Worcester, Mass.
Hofft, M. A. Co., Indianapolis, Ind.
Industrial Power Engineering ("Carrigan"), 504 Cunard Bldg., Chicago, Ill.
McCLAVE-BROOKS CO., Scranton, Pa...*p. 126*
Mershon Patent Shaking Grate Works, 5750-52 Westminster Ave., Philadelphia, Pa.
Perfection Grate & Supply Co. ("Perfection"), 164 Birnie Ave., Springfield, Mass.
Reagan Grate Bar Co., South & Charlotte Sts., Philadelphia, Pa.
Twin Fire Furnace Co., 1252 First National Bank Bldg., Chicago, Ill.
Vasil Steam Systems Co., 314 Washington Loan and Trust Bldg., Washington, D. C.

—Locomotive
Elvin Mechanical Stoker Co., 50 Church St., New York, N. Y.
FLYNN & EMRICH CO. ("Huber"), Baltimore, Md...*p. 121*
Hanna Locomotive Stoker Co. ("Hanna"), 411 Fourth National Bank Bldg., Cincinnati, Ohio
Locomotive Stoker Co., Robinson & Darrah Sts., Northside, Pittsburgh, Pa.
Standard Stoker Co., Grand Central Terminal, New York, N. Y.

—Overfeed
Armstrong Mfg. Co., Springfield, Ohio
AUTOMATIC FURNACE CO. ("Dayton"), Dayton, Ohio...*pp. 112, 113*
Burke Furnace Co., 223 W. Austin Ave., Chicago, Ill.
*CASEY-HEDGES CO., Chattanooga, Tenn...*pp. 60, 61*
Cokal Stoker Co., 1029-A N. Clark St., Chicago, Ill.
DETROIT STOKER COMPANY, Detroit, Mich...*pp. 114, 115*
*FILES ENGINEERING CO. (Inc.), Providence, R. I...*p. 122*
FLYNN & EMRICH CO. ("Huber"), Baltimore, Md...*p. 121*
McCLAVE-BROOKS CO., Scranton, Pa...*p. 126*
McKenzie Furnace Co., 647 McCormack Bldg., Chicago, Ill.
McMillan, James & Co., 114 Clarkson Court, Chicago, Ill.
*MURPHY IRON WORKS, Detroit, Mich...*p. 118*
Reagon Grate Bar Co., South & Charlotte Sts., Philadelphia, Pa.
Roach, Joseph H. & Co. (Inc.), 221 S. 15th St., Philadelphia, Pa.
Swift Stoker Co., Railway Exchange Bldg., Chicago, Ill.
*WESTINGHOUSE ELECTRIC & MFG. CO., East Pittsburgh, Pa...*pp. 150, 161*
Wetzel Mechanical Stoker Co. of New York, Inc. ("Wetzel"), 30 Church St., New York, N. Y.
Woolson, O. C. Son, 39 Cortlandt St., New York, N. Y

—Overfeed (Anthracite)
McCLAVE-BROOKS CO, Scranton, Pa...*p. 126*
Roach, Joseph H. & Co. (Inc.), 221 S. 15th St., Philadelphia, Pa.

Digitized by Google

Wetzel Mechanical Stoker Co. of New York, Inc. (''Wetzel''), 30 Church St., New York, N. Y.

—Sidefeed

AUTOMATIC FURNACE CO. (''Model Automatic''), Dayton, Ohio...*pp. 112, 113*

—Traveling Grate (Anthracite)

Combustion Engineering Corpn., (''Cox''), Broad St., New York, N. Y.

FLYNN & EMRICH CO. (''Huber''), Baltimore, Md...*p. 121*

—Underfeed

*AMERICAN ENGINEERING CO. (''Taylor''), Philadelphia, Pa...*p. 111*

Combustion Engineering Corpn. (''Type E''), Broad St., New York, N. Y.

DETROIT STOKER COMPANY, Detroit, Mich...*pp. 114, 115*

FREDERICK ENGINEERING CO., Frederick, Md...*p. 116*

Molach Co., Kaukauna, Wis.

*RILEY, SANFORD STOKER CO. (Ltd.), Worcester, Mass...*p. 119*

Roach, Joseph H. & Co. (Inc.), 221 S. 15th St., Philadelphia, Pa.

UNDER-FEED STOKER CO. OF AMERICA (''Jones ''A-C'' and Jones ''Standard''), Book Bldg., Detroit, Mich...*p. 120*

United Machine & Mfg. Co., Canton Ohio

Universal Automatic Underfeed Stoker Co., Johnstown, Pa.

*WESTINGHOUSE ELECTRIC & MFG. CO., East Pittsburgh, Pa ..*pp. 160, 161*

STONE WORKING MACHINERY

Bedford Foundry & Machine Co., Bedford, Ind.

Lincoln Iron Works, 255 West St., Rutland, Vt.

STONES, SHARPENING

Cleveland Stone Co., 1836 Euclid Ave., Cleveland, Ohio

NORTON CO., Worcester, Mass...*pp. 489, 510*

Superior Corundum Wheel Co., Waltham, Mass.

STOPPER HEADS

—Graphite

McCullough-Dalzell Crucible Co., 36th St., Pittsburgh, Pa.

Seidel, Inc., R. B. (''Seidel''), 1322 Callowhill St., Philadelphia, Pa.

—Plumbago

Ross-Tacony Crucible Co., Tacony, Philadelphia, Pa.

STRAINERS

—Oil

ANTHONY COMPANY, 138 West Ave., Long Island City, N. Y...*p. 530*

CASH, A. W. CO., Decatur, Ill...*p. 205*

Coen Co. (Inc.), (''Duplex''), 112 Market St., San Francisco, Cal.

*LOCKETT, A. M. & CO., New Orleans, La. ..*p. 131*

Plant Engineering & Equipment Co. (Inc.), 192 Broadway, New York, N. Y.

*RICHARDSON-PHENIX CO., 126 Reservoir Ave., Milwaukee, Wis...*pp. 248, 249*

*SCHUTTE & KOERTING CO., 1184 Thompson St., Philadelphia, Pa...*p. 159*

Self Cleaning Strainer Co., 6329 Stewart Ave., Chicago, Ill.

WEBSTER, WARREN & CO., Camden, N. J. ..*pp. 154, 155*

—Oil Well

COOK, A. D. (Inc.), Lawrenceburg, Ind... *p. 585*

Layne & Bowler Co., 6th & Girard Sts., Houston, Texas

—Steam

CASH, A. W., CO., Decatur, Ill...*p. 205*

DUNHAM, C. A. CO., 230 East Ohio Street, Chicago, Ill...*p. 227*

FOSTER ENGINEERING CO., Newark, N. J. ..*p. 209*

*KIELEY & MUELLER (Inc.), (''Kieley''), 34 W. 13th St., New York, N. Y...*p. 212*

*PITTSBURGH VALVE FOUNDRY & CONSTRUCTION CO., P. O. Box 1016, Pittsburgh, Pa...*pp. 192, 193*

Plant Engineering & Equipment Co. (Inc.), 192 Broadway, New York, N. Y.

*SCHUTTE & KOERTING CO., 1184 Thompson St., Philadelphia, Pa...*p. 159*

Self Cleaning Strainer Co., 6329 Stewart Ave., Chicago, Ill.

WEBSTER, WARREN & CO., Camden, N. J. *pp. 154, 155*

—Water

AMERICAN DISTRICT STEAM CO., North Tonawanda, N. Y...*p. 242*

ANTHONY CO., 138 West Ave., Long Island City, N. Y...*p. 530*

*BRAUN, C. F. & CO., San Francisco, Cal. ..*pp. 156, 157*

CASH, A. W. CO., Decatur, Ill...*p. 205*

Elliot Co., Jeannette, Pa.

FOSTER ENGINEERING CO., Newark, N. J. ..*p. 209*

*KIELEY & MUELLER (Inc.), (''Kieley''), 34 W. 13th St., New York, N. Y...*p. 212*

Rosedale Fdry. & Mach. Co., Columbus & Preble Aves., North Side, Pittsburgh, Pa.

Self Cleaning Strainer Co., 6329 Stewart Ave., Chicago, Ill.

—Water Well

COOK, A. D. (Inc.), Lawrenceburg, Ind... *p. 585*

STRAINING MACHINES, RUBBER

ROYLE, JOHN & SONS, Paterson, N. J... *p. 643*

STRUCTURAL STEEL WORK

American Bridge Co., 30 Church St., New York, N. Y.

Beach Mfg. Co., Charlotte, Mich.

Bedford Foundry & Machine Co., Bedford, Ind.

Blaw-Knox Co., P. O. Box 915, Pittsburgh, Pa.

Bridgeport Boiler Works Co., Bridgeport, Conn.

Chesapeake Iron Works, Baltimore, Md.

Dallett, Thomas H. Co., Broad & Federal Sts., Philadelphia, Pa.

FULTON IRON WORKS CO., St. Louis, Mo. ..*p. 37*

*GIFFORD-WOOD CO., Hudson N. Y.

*HENDRICK MFG. CO. Carbondale, Pa... *p. 653*

Just, Geo. A. Co., 239 Vernon Ave., Long Island City, N. Y.

Lombard Iron Work & Supply Co., Augusta, Ga.

McClintic-Marshall Co., 1217 Oliver Bldg., Pittsburgh, Pa.

McDougall & Potter Co., 606-612 W. 55th St., New York, N. Y.

Michelmann Steel Construction Co., 121-141 N. Second St., Quincy, Ill.

Phoenix Iron Co., 22 So. 15th St., Philadelphia, Pa.

Pyne Co., 927 Rupp St., Louisville, Ky.

Red Wing Iron Works Red Wing, Minn.

Russel Wheel & Foundry Co., Detroit, Mich

Schaffer Engineering & Equipment Co., 2828 Smallman St., Pittsburgh, Pa.

*SCAIFE, WM. B. & SONS CO., Oakmont, Pa...*pp. 143, 660*

Schreiber, L. & Sons Co., P. O. Box 18, Evanston Sta., Cincinnati, Ohio

UNION ENGINEERING CO., Cleveland, O. *p. 645*

St

Digitized by Google

STRUCTURAL STEEL WORK (Continued)
Vulcan Iron Works, 1849 Kearny St., San Francisco, Cal.
*WALSH & WEIDNER BOILER CO., Chattanooga, Tenn...*p. 91*
Walsh's Holyoke Steam Boiler Works, Holyoke, Mass.
Whitehead & Kales Iron Works, Beecher Ave. & M. C. R. R., Detroit, Mich.

STUD SETTERS (Opening)
Errington Mechanical Laboratory, Broadway and John St., New York, N. Y.

STUDS
(See Bolts, Stud)

SUGAR MACHINERY
Bartlett Hayward Co., Baltimore, Md.
Box, Wm. A. Iron Works Co., 33rd & Blake Sts., Denver, Colo.
Buffalo Foundry & Machine Co., 41 Winchester Avenue, Buffalo, N. Y.
*CASEY-HEDGES CO., Chattanooga, Tenn...*pp. 60, 61*
Catton-Neill & Co. (Ltd.), Honolulu, T. H.
Cresson-Morris Co., 18th St. & Allegheny Ave., Philadelphia, Pa.
Denver Engineering Works Co, 30th & Blake Sts., Denver Co.o
DU VIVIER, ERNEST H., 30 Church St., New York, N. Y...*p. 270*
Farrel Fndry. & Mach. Co. Ansonia, Conn.
Hersey Mfg. Co., South Boston, Mass.
HOOVEN, OWENS, RENTSCHLER CO., Hamilton, Ohio...*p. 10*
JEFFREY MFG. CO., 904 N. 4th St., Columbus, Ohio...*pp. 376, 377*
Kilby Mfg. Co., Cleveland, Ohio
LEBANON BOILER WORKS (J. K. Petty & Co., Inc.), 6 So. 15th St., Philadelphia, Pa...*pp. 78, 79*
Pratt Engineering & Machine Co., Atlanta, Ga.
Sutter, Geo. L. Mfg. Co., Buffalo, N. Y.
STEACY SCHMIDT MFG CO., York, Pa...*p. 612*
Treadwell, M. H. Co., 140 Cedar St., New York, N. Y.
Turl Iron & Car Co. (Inc.), 50 Broad St., New York, N. Y.
United States & Cuban Allied Works Engrg. Corpn., 50 Church St., New York, N. Y.
*U. S. CAST IRON PIPE & FOUNDRY CO., Burlington, N. J...*pp. 232, 233*
Vulcan Iron Works, Wilkes-Barre, Pa.
*WALSH & WEIDNER BOILER CO., Chattanooga, Tenn...*p. 91*
WOOD, R. D. & CO., Philadelphia, Pa...*p. 597*

SUGAR MACHINERY
—Beet
Dyer Co., 2031 Euclid Ave., Cleveland, Ohio
Kilby Mfg. Co., Cleveland, Ohio
Stearns Roger Mfg. Co., 1718-1720 California St. Denver, Colo.
SWENSON EVAPORATORS CO., 945 Monadnock Bldg., Chicago, Ill...*p. 611*
WELLER MFG. CO., 1820-1856 N. Kostner Ave., Chicago, Ill...*p. 381*
—Cane
Birmingham Machine & Foundry Co., Birmingham, Ala.
Dyer Co., 2031 Euclid Ave., Cleveland, Ohio
FULTON IRON WORKS CO., St. Louis, Mo...*p. 37*
Honolulu Iron Works Co., Honolulu, T. H.
WELLER MFG. CO., 1820-1856 N. Kostner Ave., Chicago, Ill...*p. 381*

SUPERHEATERS, STEAM
—Locomotive
Power Specialty Co., 111 Broadway, New York, N. Y.
*SUPERHEATER CO. ("Elesco"), 17 East 42nd St., New York, N. Y...*p. 98*
—Marine
*BABCOCK & WILCOX CO., 85 Liberty St., New York, N. Y...*pp. 52, 53, 54, 55*
Foster Marine Boiler Co., 111 Broadway, New York, N. Y.
Power Specialty Co., 111 Broadway, New York, N. Y.
—Stationary
*BABCOCK & WILCOX CO., 85 Liberty St., New York, N. Y...*pp. 52, 53, 54, 55*
Babcock & Wilcox (Ltd.) College St., St. Henry, Montreal Canada
BADENHAUSEN, PHILLIPS ("Simplex"), 1425 Chestnut Street, Philadelphia, Pa...*p. 56*
Bravo Co., 2918-22 Burleigh St., Milwaukee, Wis.
Pardel Corn., Sheridan Bldg., 9th & Sansom Sts., Philadelphia, Pa.
Power Specialty Co. ("Foster"), 111 Broadway, New York, N. Y.
Superheater & Engineering Co., 1816 Woolworth Bldg., New York, N. Y.
*SUPERHEATER CO. ("Elasco"), 17 East 42nd St., New York, N. Y...*p. 98*
—Steam Shovel
*SUPERHEATER CO. ("Elesco"), 17 East 42nd St., New York, N. Y...*p. 98*

SUPPLIES: See

Brickyard	Pipe Line
Electric	Platers'
Engineers'	Plumbing
Fire Department	Polishers'
Foundry	Radio
Gas Well	Roofers'
Ice Plant	Waterworks
Oil Well	Welding
Oxy-Acetylene	Well

SWAGING MACHINES
Farnham Mfg. Co., 31-39 Indiana St., Buffalo N. Y.
Langelier Mfg. Co., 51 Washington Ave., Arlington, Cranston, R. I.
Torrington Co. ("Dayton"), Torrington, Conn.

SWITCHBOARDS
Carleton-Mace Engine Corpn., 18 Tremont St., Boston, Mass.
Condit Electrical Mfg. Co., 838 Summer St., South Boston Mass.
Frost Engineering Co., Evansville, Wis.
*GENERAL ELECTRIC CO., Schenectady, N. Y...*pp. 18, 19, 20, 21*
Weir Frog Co. Sta. H., Cincinnati, Ohio
*WESTINGHOUSE ELECTRIC & MFG. CO., East Pittsburgh, Pa...*pp. 160, 161*

SWITCHES
—Electric
Automatic Reclosing Circuit Breaker Co., 6th & Wesley Aves., Columbus, Ohio
Condit Electrical Mfg. Co., 838 Summer St., South Boston, Mass.
Electric Storage Battery Co., Allegheny Ave. & 19th St., Philadelphia, Pa.
*GENERAL ELECTRIC CO., Schenectady, N. Y...*pp. 18, 19, 20, 21*
Ives Mfg. Co., Baltimore, Md.
Johns-Pratt Co. 555 Capitol Ave., Hartford, Conn.
Sundh Electric Co., 209 Parkhurst St., Newark, N. J.
*WESTINGHOUSE ELECTRIC & MFG. CO., East Pittsburgh, Pa...*pp. 160, 161*
—Float
Chicago Automatic Switch Co., 212 N. Peoria St., Chicago, Ill.

Digitized by Google

—Overhead Tramrail
MARIS BROS. (Inc.), 5546 Grays Ave., Philadelphia, Pa...*p. 395*
Philadelphia Tramrail Co. Front & Indiana Ave., Philadelphia, Pa.

SWITCHES AND FROGS
Helmick Foundry & Machine Co., Fairmont, W. Va.
The Weir Frog Co., Sta. H., Cincinnati, Ohio
Wharton, Wm., Jr. & Co. (Inc.) P. O. Box 124, Easton, Pa.

SWIVELS, HOIST HOOK
WILLIAM, J. H. & CO., 70 Richards St., Brooklyn, N. Y...*p. 517*

SYRUP MACHINERY
Red Wing Iron Works, Red Wing, Minn.

SYSTEMS: *See*
Acid Control
Air Control
Air Lift Pumping
Ammonia Safety
Ash Handling
Balanced Draft
Boiler Cleaning
Cold Storage
Combustion Control
Condensation Return
Conveying
Draft Control
Dust Collecting
Exhaust
Generator Cooling
Heating
Holly Gravity-Return
Hydraulic Press Control
Lubricating
Machine Tool Feed
Mono Rail
Oil Filtering
Oil Storage
Oiling
Overhead Track
Shavings and Sawdust
Soot Blowing
Spray Cooling
Sprinkler
Stoker Control
Tramrail
Vacuum Drying
Ventilating
Water Supply

T

TABLET MAKING MACHINES
Hess & Barker, 212-22 So. Darien St., Philadelphia, Pa.

TACHOMETERS
*BACHARACH INDUSTRIAL INSTRUMENT CO., Pittsburgh, Pa...*p. 279*
*BRISTOL CO., Waterbury, Conn...*p. 291*
BROWN INSTRUMENT CO. ("Brown"), Philadelphia, Pa...*p. 292*
ELECTRIC TACHOMETER Co., Philadelphia, Pa...*p. 299*
*FOXBORO CO. (Inc.), Foxboro, Mass...*p. 293*
Holz & Co. (Inc.), 17 Madison Ave., New York, N. Y.
*JOHN-MANVILLE, INC., New York, N. Y. ...*p. 244*
Queen-Gray Co. 616-20 Chestnut St., Philadelphia, Pa.
*SCHAEFFER & BUDENBERG MFG. CO., Brooklyn, N. Y...*p. 295*
Standard Thermometer Co., 65 Shirley St., Boston, Mass.
*STARRETT, L. S. CO., Athol Mass...*p. 505*
Thompson-Levering Co. 325 Arch St., Philadelphia, Pa.
Van Sicklen Speedometer Co., 19 N. Spring St., Elgin, Ill.
Veeder Mfg. Co. 20 Sargent St., Hartford, Conn.
Wilson-Maeulen Co., 781 E. 142nd St., New York, N. Y.
Zernickow, O. ("O. Z."), 15 Park Row, New York, N. Y.

—Electric
BIDDLE, JAMES G. ("Frahm, Jagabi"), 1211-1213 Arch St., Philadelphia, Pa...*p. 298*
ELECTRIC TACHOMETER CORPN. Philadelphia, Pa...*p. 299*

—Electro-Magnetic
BIDDLE, JAMES G., 1211-13 Arch St., Philadelphia, Pa...*p. 298*
BROWN INSTRUMENT CO. ("Brown"), Philadelphia, Pa...*p. 292*

—Vibrating-Reed
BIDLE, JAMES G. ("Frahm"), 1211-1213 Arch St., Philadelphia, Pa...*p. 298*

TACHOSCOPES
BIDDLE, JAMES G. ("Frahm"), 1211-1213 Arch St., Philadelphia, Pa...*p. 298*
*SCHAEFFER & BUDENBERG MFG. CO., Brooklyn, N. Y...*p. 295*
Zernickow, O. ("O Z"), 15 Park Row, New York, N. Y.

TACK MAKING MACHINERY
Perkins, Henry Co., Bridgewater, Mass.

TACKLE BLOCKS
(See Blocks, Tackle)

TAMPING MACHINES (Track)
*PAWLING & HARNISCHFEGER CO. ("P & H"), Milwaukee, Wis...*p. 398*

TANKS
—Acid
*CALDWELL, W. E. CO., (Inc.), 340 E. Brandeis St., Louisville, Ky...*p. 323*
*CASEY-HEDGES CO., Chattanooga, Tenn. ...*pp. 60, 61*
COATESVILLE BOILER WORKS, Coatesville, Pa...*p. 62*
*COLE, R. D. MFG. CO., Newnan, Ga...*p. ..63*
CONNERY & CO. (Inc.), 2nd & Luzerne Sts., Philadelphia, Pa...*p. 651*
DEVINE, J. P. CO., 1375 Clinton St., Buffalo, N. Y...*pp. 606, 607*
Johnson & Thompson, Birmingham, Ala.
LASKER IRON WORKS, 3201 So. Lincoln St., Chicago, Ill...*p. 655*
McAleenan Bros. & Co., 25th & R. R. Sts., Pittsburgh, Pa.
MILWAUKEE RELIANCE BOILER WORKS, Milwaukee, Wis...*p. 148*
NEW YORK CENTRAL IRON WORKS CO. (Inc.), North Middleburg Road, Haggerstown, Md...*p.659*
VALLEY IRON WORKS CO., Appleton, Wis. ..*p. 647*

—Aluminum
DEVINE, J. P. CO., 1375 Clinton St., Buffalo, N. Y...*pp. 606, 607*

—Ammonia
DEVINE, J. P. CO., 1375 Clinton St., Buffalo, N. Y...*pp. 606, 607*
LASKER IRON WORKS, 3201 So. Lincoln St., Chicago, Ill...*p. 655*

—Brazed
KOVEN, L. O. & BROTHER, 154 Ogden Ave., Jersey City, N. J...*p. 605*
LANCASTER IRON WORKS, (Inc.), Lancaster, Pa...*pp. 656, 657*
MORRISON BROS., Dubuque, Iowa...*p. 658*
*U. S. CAST IRON PIPE & FOUNDRY CO., Burlington, N. J...*pp. 232, 233*

Ta

Digitized by Google

TANKS (Continued)

*WALSH & WEIDNER CO., Chattanooga, Tenn...*p. 91*

—Car

ERIE CITY IRON WORKS, Erie, Pa...*pp. 66, 67*
LASKER IRON WORKS, 3201 So. Lincoln St., Chicago, Ill...*p. 655*
TITUSVILLE IRON WORKS CO., Titusville, Pa...*p. 89*

—Copper

*BADGER, E. B. & SONS CO., 75 Pitts St., Boston, Mass...*p. 164*
GEUDER, PAESCHKE & FREY CO. ("G P & F"), Western Valley, Milwaukee, Wis. ..*p. 434*

—Expansion

LASKER IRON WORKS, 3201 S. Lincoln St., Chicago, Ill...*p. 655*
NEW YORK CENTRAL WORKS CO. (Inc.), North Middleburg Road, Hagerstown, Md. ..*p. 659*

—Filter

ELMES, CHAS. F. ENGINEERING WORKS, 215 N. Morgan St., Chicago, Ill...*p. 591*
LASKER IRON WORKS, 3201 So. Lincoln St., Chicago, Ill...*p. 655*
NEW YORK CENTRAL IRON WORKS CO. (Inc.), North Middleburg Road, Hagerstown Md...*p. 659*
Steel Tank & Products Corp'n., 26 W. Jefferson St., Chicago, Ill.

—Galvanized

Borger Bros. Boiler Works, 257 W. Spring St., Columbus, Ohio
DEVINE, J. P. CO., 1875 Clinton St., Buffalo, N. Y...*pp. 606, 607*
FAIRBANKS, MORSE & CO., 900 S. Wabash Ave., Chicago, Ill...*p. 41*
GEUDER, PAESCHKE & FREY CO. ("G P & F"), Milwaukee, Wis...*p. 434*
LASKER IRON WORKS, 3201 So. Lincoln St., Chicago, Ill...*p. 655*

—Gasoline Storage

American Oil Pump & Tank Co., Findley & Dalton Sts., Cincinnati, Ohio
BIGGS BOILER WORKS CO., Case Ave. & Newton St., Akron, Ohio..*p. 650*
Bowser, S. F. & Co. (Inc.), Ft. Wayne, Ind.
Buckeye Boiler Co., 1617 McLain St., Dayton, Ohio
Burnham Boiler Corp'n, Irvington, N. Y.
*CALDWELL, W. E. CO., 304 E. Brandeis St., Louisville, Ky...*p. 323*
*CASEY-HEDGES CO., Chattanooga, Tenn. ..*pp. 60, 61*
COATESVILLE BOILER WORKS, Coatesville, Pa...*p.*
*COLE, R. D. MFG. CO., Newnan, Ga...*p. 63*
CONNERY & CO. (Inc.), 2nd & Luzerne Sts., Philadelphia, Pa...*p. 657*
KEWANEE BOILER CO., Kewanee, Ill...*pp. 622, 623, 624*
KOVEN, L. O. & BROTHER, 154 Ogden Ave., Jersey City, N. J...*p. 605*
Kupferle Bros. Mfg. Co., 600 N. 2nd St., St. Louis, Mo.
LASKER IRON WORKS, 3201 So. Lincoln St., Chicago, Ill...*p. 655*
MILWAUKEE RELIANCE BOILER WORKS, ("Reliance") Milwaukee, Wis...*p. 148*
MORRISON BROS., Dubuque, Iowa.
NEWBURGH STEAM BOILER WORKS, (P. Delaney & Co.), Newburgh, N. Y...*p. 64*
NEW YORK CENTRAL IRON WORKS CO. (Inc.), North Middleburg Road, Hagerstown, Md...*p. 659*
*SCAIFE, WM. B. & SONS CO., Oakmont, Pa...*pp. 143, 660*
*TITUSVILLE IRON WORKS CO., Titusville, Pa...*p. 89*

—Hydro-Pneumatic

BIGGS BOILER WORKS CO., Case Ave. & Newton St., Akron, Ohio..*p. 650*
FAIRBANKS, MORSE & CO., 900 S. Wabash Ave., Chicago, Ill...*p. 41*
KEWANEE BOILER CO., Kewanee, Ill...*pp. 622, 623, 624*
LANCASTER IRON WORKS (Inc.), Lancaster, Pa...*pp. 656, 657*
LASKER IRON WORKS, 3201 So. Lincoln St., Chicago, Ill...*p. 655*
MORRISON BROS., Dubuque, Iowa..*p. 658*
Nagle Engine & Boiler Works, 234 E. 16th St., Erie, Pa.
NEWBURGH STEAM BOILER WORKS, (P. Delaney & Co.), Newburgh, N. Y...*p. 64*
NEW YORK CENTRAL IRON WORKS CO. (Inc.), North Middleburg Road, Hagerstown, Md...*p. 659*
SIMS CO., Erie, Pa...*p. 158*
*TITUSVILLE IRON WORKS CO., Titusville, Pa...*p. 89*
WEBSTER, WARREN & CO., Camden, N. J. ..*pp. 154, 155*
Wildex Co., Richmond, Ind.

—Ice

Borger Bros. Boiler Works, 257 W. Spring St., Columbus, Ohio

—Jacketed

BIGGS BOILER WORKS CO., Case Ave. & Newton St., Akron, Ohio..*p. 650*
DEVINE, J. P. CO., 1375 Clinton St., Buffalo, N. Y...*pp. 606, 607*
INTERNATIONAL ENGINEERING WORKS (Inc.), Framingham, Mass...*pp. 72, 73*
LANCASTER IRON WORKS (Inc.), Lancaster, Pa...*pp. 656, 657*
LASKER IRON WORKS, 3201 So. Lincoln St., Chicago, Ill...*p. 655*
*TITUSVILLE IRON WORKS CO., Titusville, Pa...*p. 89*

—Motor Truck and Wagon

MORRISON BROS., Dubuque, Iowa..*p. 658*
*RICHARDSON-PHENIX CO., 126 Reservoir Ave., Milwaukee, Wis..*pp. 248, 249*

—Oil

BIGGS BOILER WORKS CO., Case Ave. & Newton St., Akron, Ohio..*p. 650*
*CALDWELL, W. E. CO., 340 E. Brandeis St., Louisville, Ky...*p. 323*
COATESVILLE BOILER WORKS, Coatesville, Pa...*p. 62*
CONNERY & CO. (Inc.), 2nd and Luzerne Sts., Philadelphia, Pa...*p. 651*
Downington Iron Works, (Inc.), Downington, Pa.
FAIRBANKS, MORSE & CO., 900 S. Wabash Ave., Chicago, Ill...*p. 41*
GEUDER, PAESCHKE & FREY CO. ("G P & F"), Western Valley, Milwaukee, Wis. ..*p. 434*
INTERNATIONAL ENGINEERING WORKS, (Inc.), Framingham, Mass...*pp. 72, 73*
Johnston & Thompson, Birmingham, Ala.
KEWANEE BOILER CO., Kewanee, Ill...*pp. 622, 623, 624*
LANCASTER IRON WORKS, (Inc.), Lancaster, Pa...*pp. 656, 657*
LASKER IRON WORKS, 321 So. Lincoln St., Chicago, Ill...*p. 655*
McAleenan Bros. Co., 25th & R. R. Sts., Pittsburgh, Pa.
MORRISON BROS., Dubuque, Iowa..*p. 658*
NEWBURGH STEAM BOILER WORKS, (P. Delaney & Co.), Newburgh, N. Y...*p. 64*
NEW YORK CENTRAL IRON WORKS CO. (Inc.), North Middleburg Road, Hagerstown, Md...*p. 659*

Digitized by Google

*TITUSVILLE IRON WORKS CO., Titusville, Pa...*p. 89*
Turner Oil Filter Co., Niles, Mich.
Wildex Co., Richmond, Ill.

—Paint and Varnish
BIGGS BOILER WORKS CO., Case Ave. & Newton St., Akron, Ohio...*p. 650*
CONNERY & CO. (Inc.), 2nd and Luzerne Sts., Philadelphia, Pa...*p. 651*
INTERNATIONAL ENGINEERING WORKS, (Inc.), Framingham, Mass...*pp. 72, 73*
KOVEN, L. O. & BROTHER, 150 Ogden Ave., Jersey City, N. J...*p. 605*
LASKER IRON WORKS, 3201 Lincoln St., Chicago, Ill...*p. 655*
NEWBURGH STEAM BOILER WORKS, (P. Delaney & Co.), Newburgh, N. Y...*p. 64*
NEW YORK CENTRAL IRON WORKS CO. (Inc.), North Middleburg Road, Hagerstown, Md...*p. 659*

—Pressure
BASS FOUNDRY & MACHINE CO., Fort Wayne, Ind...*p. 57*
*BIGELOW CO., 76 River St., New Haven, Conn...*p. 58*
BIGGS BOILER WORKS CO., Case Ave. & Newton St., Akron, Ohio..*p. 650*
Borger Bros. Boiler Works, 257 W. Spring St., Columbus, Ohio
BROWNELL CO., Dayton, Ohio..*p. 59*
Buckeye Boiler Co., 1617 McLain St., Dayton, Ohio
Burnham Boiler Corp'n, Irvington, N. Y.
*CALDWELL, W. E. CO., 340 E. Brandeis St., Louisville, Ky...*p. 323*
*CASEY-HEDGES CO., Chattanooga, Tenn. ..*pp. 60, 61*
COATESVILLE BOILER WORKS, Coatesville, Pa...*p. 62*
*COLE, R. D. MFG. CO., Newnan, Ga...*p. 63*
CONNERY & CO. (Inc.), 2nd and Luzerne Sts., Philadelphia, Pa...*p. 651*
DEVINE, J. P. CO., 1375 Clinton St., Buffalo, N. Y...*pp. 606, 607*
Downington Iron Works (Inc.), Downington, Pa.
ELECTROLABS CO., Pittsburgh, Pa...*p. 536*
FARRAR & TREFTS, Buffalo, N. Y...*p. 652*
Gem City Boiler Co., Dayton, Ohio
GEUDER, PAESCHKE & FREY CO. ("G P & F."), Western Valley, Milwaukee, Wis. ..*p. 434*
INTERNATIONAL ENGINEERING WORKS (Inc.), Framingham, Mass...*pp. 72, 73*
Janney, Steinmetz & Co. ("Jasco"), 1421 Chestnut St., Philadelphia, Pa.
*KEELER, E. CO., Williamsport, Pa...*p. 68*
KEWANEE BOILER CO., Kewanee, Ill...*pp. 622, 623, 624*
KOVEN, L. O. & BROTHER, 154 Ogden Ave., Jersey City, N. J...*p. 605*
KROESCHELL BROS. CO., 460 West Erie St., Chicago, Ill...*p. 75*
LANCASTER IRON WORKS (Inc.), Lancaster, Pa...*pp. 656, 657*
LASKER IRON WORKS, 3201 So. Lincoln St., Chicago, Ill...*p. 655*
Leslie & Elliott Co., Cor. E. Railway & Iowa Ave., Paterson, N. J.
Lunt-Moss Co., 43 S. Market St., Boston, Mass.
MILWAUKEE RELIANCE BOILER WORKS ("Reliance"), Milwaukee, Wis...*p. 148*
MORRISON BROS., Dubuque, Iowa..*p. 658*
Nagle Engine & Boiler Works, 234 E. 16th St., Erie, Pa.
NEWBURGH STEAM BOILER WORKS (P. Delaney & Co.), Newburgh, N. Y...*p. 64*
New Haven Boiler Works (Inc.), New Haven, Conn.
NEW YORK CENTRAL IRON WORKS CO., (Inc.), North Middleburg Road, Hagerstown, Md...*p. 659*
Pennsylvania Boiler Works, 12th & Penna. Ave., Erie, Pa.
Ruemmeli-Dawley Mfg. Co., 3923 Chouteau Ave., St. Louis, Mo.
Riverside Boiler Works (Inc.), 491 Main St., Cambridge, Mass.
*SCAIFE, WM. B. & SONS CO., Oakmont, Pa. *pp. 143, 660*
SIMS CO., Erie, Pa...*p. 152*
Steel Tank & Products Corp'n., 26 N. Jefferson St., Chicago, Ill.
Stewart Boiler Works, Albany St., Worcester, Mass.
TITUSVILLE IRON WORKS CO., Titusville, Pa...*p. 89*
Tudor Boiler Mfg. Co., 715 E. Third St., Cincinnati, Ohio
*WALSH & WEIDNER BOILER CO., Chattanooga, Tenn...*p. 91*
Wildex Co., Richmond, Ind.
Wood, John Mfg. Co., Conshohocken, Pa.

—Railroad (Locomotive)
*CALDWELL, W. E. CO., 340 E. Brandeis St., Louisville, Ky...*p. 323*
*COLE, R. D. MFG. CO., Newnan, Ga...*p. 63*

—Septic
CONNERY & CO. (Inc.), 2nd and Luzerne Sts., Philadelphia, Pa...*p. 651*
KOVEN, L. O. & BROTHER, 154 Odgen Ave., Jersey City, N. J...*p. 605*

—Ship
BIGGS BOILER WORKS CO., Case Ave. & Newton St., Akron, Ohio..*p. 650*
LASKER IRON WORKS, 3201 So. Lincoln St., Chicago, Ill...*p. 655*

—Sprinkler
BIGGS BOILER WORKS CO., Case Ave., & Newton St., Akron, Ohio..*p. 650*
*CALDWELL, W. E. CO., 340 E. Brandeis St., Louisville, Ky...*p. 323*
*COLE, R. D. MFG. CO., Newnan, Ga...*p. 63*
CONNERY & CO. (Inc.), 2nd and Luzerne Sts., Philadelphia, Pa...*p. 651*
KOVEN, L. O. & BROTHER, 154 Ogden Ave. Jersey City, N. J...*p. 605*
KROESCHELL BROS. CO., 450 West Erie St., Chicago, Ill...*p. 75*
LASKER IRON WORKS, 3201 So. Lincoln St., Chicago, Ill...*p. 655*
*TITUSVILLE IRON WORKS CO., Titusville, Pa...*p. 89*

—Steam Jacketed (Glass Lined)
Pfaudler Co., 217 Cutler Bldg., Rochester, N. Y.

—Steel
Acme Boiler & Tank Co., 48th & Morgan Sts., Chicago, Ill.
Akerlung & Semmes, 17 Battery Place, New York, N. Y.
AMES IRON WORKS, Oswego, N. Y...*p. 4*
Bay City Iron Works, 1215-45 Harrison St., San Francisco, Cal.
*BIGELOW CO., 76 River St., New Haven, Conn...*p. 58*
BIGGS BOILER WORKS CO., Case Ave. & Newton St., Akron, Ohio...*p. 650*
Borger Bros. Boiler Works, 257 W. Spring St., Columbus, Ohio
BRASS FOUNDRY & MACHINE CO., Fort Wayne, Ind...*p. 57*
Brennan, John & Co., 24th St. & M. C. R. R., Detroit, Mich.
Bridgeport Boiler Works Co., Bridgeport, Conn.
Bros. Wm. Boiler & Mfg. Co., Minneapolis, Minn.
BROWNELL CO., Dayton, Ohio..*p. 59*
*CALDWELL, W. E. CO., 340 E. Brandeis St., Louisville, Ky...*p. 323*
Carroll-Porter Boiler & Tank Co., Pittsburg, Pa.
Chicago Bridge & Iron Works, 2131 Old Colony Bldg., Chicago, Ill.

Ta

Digitized by Google

TANKS (Continued)

Codd, E. J. Co., 700-708 Caroline St., Baltimore, Md.
*COLE, R. D. MFG. CO., Newnan, Ga...*p. 63*
CONNERY & CO. (Inc.), 2nd and Luzerne Sts., Philadelphia, Pa...*p. 651*
Cunningham, Christopher Co., Greenpoint Ave. & Newton Creek, Brooklyn, N. Y.
DEVINE, J. P. CO., 1375 Clinton St., Buffalo, N. Y...*pp. 606, 607*
Dover Boiler Works, 50 Church St., New York, N. Y.
*ERIE CITY IRON WORKS, Erie, Pa...*pp. 66, 67*
FARRAR & TREFTS, Buffalo, N. Y...*p. 652*
Fleming Mfg. Co., New Castle Pa.
FROST MFG. CO., 112 West Adams St., Chicago, Ill...*pp. 68, 634*
GEUDER, PAESCHKE & FREY CO. ("G P & F"), Western Valley, Milwaukee, Wis. ..*p. 434*
Gillespie Mfg. Corpn., 12th & Monmouth Sts., Jersey City, N. J.
Graver Corp'n., 283 Jackson Blvd., East Chicago, Ind.
Hammond Iron Works, Warren, Pa.
*HEINE BOILER CO. ("Heine"), St. Louis, Mo...*pp. 70, 71*
*HENDRICK MFG. CO., Carbondale, Pa...*p. 653*
HONHORST, JOS. CO., 1016-20 N. 6th St., Cincinnati, Ohio..*p. 654*
INTERNATIONAL ENGINEERING WORKS (Inc.), Framingham, Mass...*pp. 72, 73*
Johnson & Thompson, Birmingham, Ala.
Kaw Boiler Works Co., Kansas City, Mo.
*KEELER E. CO., Williamsport, Pa...*p. 69*
Kelly Foundry & Machine Co., E. Purl St., Goshen, Ind.
KEWANEE BOILER CO., Kewanee, Ill... ..*pp. 622, 623, 624*
Kittoe Boiler & Tank Co. (Inc.), Canton, Ohio
KROESCHELL BROS. CO., 460 West Erie St., Chicago, Il...*p. 75*
LANCASTER IRON WORKS (Inc.), Lancaster, Pa...*pp. 656, 657*
LASKER IRON WORKS, 3201 So. Lincoln St., Chicago, Ill...*p. 655*
LEBANON BOILER WORKS (J. K. Petty & Co., Inc.), 6 So. 15th St., Philadelphia, Pa...*pp. 78, 79*
Llewellyn Iron Works, Los Angeles, Cal.
Lookout Boiler & Mfg. Co., Chattanooga, Tenn.
Mack Bros. Boiler & Sheet Iron Works, Syracuse, N. Y.
McAleenan Bros. Co., 25th & R. R. Sts., Pittsburgh, Pa.
McDermott Engineering Co., Whitehall & Jordan Sts., Allentown, Pa.
McNamara Brothers Co., Westport, Baltimore, Md.
McNaull Boiler Mfg. Co., Toledo, O.
McNeil, James & Bros. Co., 29th St. & A. V. R. R., Pittsburgh, Pa.
Meehan Boiler & Construction Co., Lowellville, Ohio
Michelmann Steel Construction Co., 121-141 N. Second St., Quincy, Ill.
MILWAUKEE RELIANCE BOILER WORKS, ("Reliance"), Milwaukee, Wis...*p. 148*
MORRISON BROS., Dubuque, Iowa...*p. 658*
MURRAY IRON WORKS CO., Burlington, Iowa...*pp. 80, 81*
NEWBURGH STEAM BOILER WORKS (Delany, P. & Co.), Newburgh, N. Y...*p. 64*
New Haven Boiler Works (Inc.), New Haven, Conn.
*O'BRIEN, JOHN BOILER WORKS CO., St. Louis, Mo...*p. 83*
Ocean Shore Iron Works, 550-8th St., San Francisco, Cal.
Ohio Machine & Boiler Co., 1503 University St., Cleveland, Ohio
Pennsylvania Boiler Works, 12th & Penna Ave., Erie, Pa.
Prospect Boiler Co., Ward St. & Raritan River R. R., New Brunswick, N. J.
Pyne Co., 927 Rupp St., Louisville, Ky.
Reeves Bros. Co., Box K., Alliance, Ohio
Richmond Engineering Co., 937 Brook Ave., Richmond, Va.
Riter-Conley Co., Oliver Bldg., Pittsburg, Pa.
Riverside Boiler Works (Inc.), 491 Main St., Cambridge, Mass.
Ruemmeli-Dawley Mfg. Co., 3900 Chouteau Ave., St. Louis, Mo.
*SCAIFE, WM. B., Oakmont, Pa...*pp. 143, 660*
Schofield's, J. S. Sons Co., Macon, Ga.
Sharpsvile Boiler Works, Sharpsville, Pa.
Stacey Manufacturing Co., Elmwood Place, Cincinnati, Ohio
Star Boiler Works, Clinton, Iowa
STEACY-SCHMIDT MFG. CO., York, Pa. ..*p. 612*
Steel Tank & Products Corp'n., 26 N. Jefferson St., Chicago, Ill.
Tippett & Wood, 166 Howard St., Phillipsburg, N. J.
*TITUSVILLE IRON WORKS CO., Titusville, Pa...*p. 89*
Treadwell Construction Co., Midland, Pa.
Treadwell, M. H. Co., 140 Cedar St., New York, N. Y.
Turl Iron & Car Co. (Inc.), 50 Broad St., New York, N. Y.
Turner Oil Filter Co., Niles, Mich.
Union Boiler & Mfg. Co., Lebanon, Pa.
*UNION IRON WORKS, Erie, Pa...*p.90*
*VOGT, HENRY MACHINE CO., Louisville, Ky...*pp. 632, 633*
*WALSH & WEIDNER BOILER CO., Chattanooga, Tenn...*p. 91*
Walsh's Holyoke Steam Boiler Works, Holyoke, Mass.
Walton, C. & Son, 1221 W. Main St., Louisville, Ky.
Warren City Tank & Boiler Co., Warren Ohio
Western Drop Forge Co., Marion, Ind.
Western Gas Construction Co., Fort Wayne, Ind.
Wholey Boiler Works, 95 Whipple St., Providence, R. I.
*WICKES BOILER CO., Saginaw, Mich...*p. 93*
WOOD, R. D. & CO., Philadephia, Pa...*p. 597*
YORK MANUFACTURING CO., York, Pa ..*p. 631*

—Steel (Glass Enameled)

GEUDER, PAESCHKE & FREY CO. ("G. P & F"), Western Valley, Milwaukee, Wis...*p. 434*

—Storage

AMES IRON WORKS, Oswego, N. Y...*p. 4*
*BIGELOW CO., 76 River St., New Haven, Conn...*p. 58*
BIGGS BOILER WORKS CO., Case Ave. & Newton St., Akron, Ohio...*p. 650*
Borger Bros., 257 W. Spring St., Columbus, Ohio
BROWNELL CO., Dayton, Ohio..*p. 59*
Burnham Boiler Corp'n., Irvington, N. Y.
Butler Mfg. Co., 1326 Grand Ave., Kansas City, Mo.
*CALDWELL, W. E. CO., 340 E. Brandeis St., Louisville, Ky...*p. 333*
Chicago Bridge & Iron Works, 2131 Old Colony Bldg., Chicago, Ill.
COATESVILLE BOILER WORKS, Coatesville, Pa...*p. 62*

Digitized by Google

*COLE, R. D. MFG. CO., Newnan, Ga...*p. 63*
CONNERY & CO. (Inc.), 2nd and Luzerne Sts., Philadelphia, Pa...*p. 651*
DEVINE, J. P. CO., 1375 Clinton St., Buffalo, N. Y...*pp. 606, 607*
FAIRBANKS, MORSE & CO., 900 S. Wabash Ave., Chicago, Ill...*p. 41*
Godfrey, Keeler Co., 70 Warren St., New York, N. Y.
H. S. B. W.-COCHRANE CORP'N., Philadelphia, Pa...*pp. 146, 147*
Hammond Iron Works, Warren, Pa.
HONHORST, JOS. CO., 1016-20 W. 6th St., Cincinnati, Ohio...*p. 654*
INTERNATIONAL ENGINEERING WORKS (Inc.), Framingham, Mass...*pp. 72, 73*
Kaw Boiler Works Co., Kansas City, Mo.
KEWANEE BOILER CO., Kewanee, Ill...*pp. 622, 623, 624*
KOVEN, L. O. & BROTHER, 154 Ogden Ave., Jersey City, N. J...*p. 605*
KROESCHELL BROS. CO., 460 West Erie St., Chicago, Ill...*p. 75*
LANCASTER IRON WORKS (Inc.), Lancaster, Pa...*pp. 656, 657*
LASKER IRON WORKS, 3201 So. Lincoln St., Chicago, Ill...*p. 655*
MILWAUKEE RELIANCE BOILER WORKS ("Reliance"), Milwaukee, Wis...*p. 148*
MORRISON BROS., Dubuque, Iowa...*p. 658*
NEWBURGH STEAM BOILER WORKS (P. Delany & Co.), Newburgh, N. Y...*p. 64*
NEW YORK CENTRAL IRON WORKS CO. (Inc.), North Middleburg Road, Hagerstown, Md...*p. 569*
Pennsylvania Boiler Works, 12th & Penna Ave., Erie, Pa.
Petroleum Iron Works, Sharon, Pa.
Phoenix Iron Works Co., Meadville, Pa.
Richmond Water Softener Co., Richmond, Ind.
Ruemmeli-Dawley Mfg. Co., 3900 Chouteau Ave., St. Louis, Mo.
SCAIFE, WM. B. & SONS CO., Oakmont, Pa...*pp. 143, 660*
SIMS CO., Erie, Pa...*p. 152*
SMITH, SAMUEL & SON CO., Paterson, N. J...*p. 88*
Standard Boiler & Plate Iron Co., Niles, Ohio
STEACY-SCHMIDT MFG. CO., York Pa...*p. 612*
*TITUSVILLE IRON WORKS CO., Titusville, Pa...*p. 89*
United Iron Works, Inc., 401 Ridge Arcade Bdg., Kansas City, Mo.
*WALSH & WEIDNER BOILER CO., Chattanooga, Tenn...*p. 91*
Wayne Oil Tank & Pump Co., 749 Canal St., Fort Wayne, Ind.
Wildex Co., Richmond, Ind.
Wilson Steam Boiler Co., 1919-27 S. 20th St., Omaha, Nebr.
WOOD, R. D. & CO., Philadelphia, Pa...*p. 597*

—Storage (Cast Iron)
*U. S. CAST IRON PIPE & FOUNDRY CO., Burlington, N. J...*pp. 232, 233*

—Storage (Glass Lined)
PFAUDLER CO., 217 Cutler Bldg., Rochester, N. Y.

—Tower
*CALDWELL, W. E. CO., 340 E. Brandeis St., Louisville, Ky...*p. 323*
*COLE, R. D. MFG. CO., Newnan, Ga...*p. 63*
CONNERY & CO. (Inc.), 2nd and Luzerne Sts., Philadelphia, Pa...*p. 651*
INTERNATIONAL ENGINEERING WORKS (Inc.), Framingham, Mass...*pp. 72, 73*
KOVEN, L. O. & BROTHER, 154 Ogden Ave., Jersey City, N. J...*p. 605*
*SCAIFE, WM. B. & SONS CO., Oakmont, Pa...*pp. 143, 660*
*WALSH & WEIDNER BOILER CO., Chattanooga, Tenn...*p. 91*
WOOD, R. D. & CO., Philadelphia, Pa...*p. 597*

—Welded
Cave Welding & Mfg. Co., 32 Liberty St., Springfield, Mass.
*COLE, R. D. MFG. CO., Newnan, Ga...*p. 63*
Electric Welding Co. of America, 716 Court St., Brooklyn, N. Y.
FARRAR & TREFTS, Buffalo, N. Y...*p. 652*
HONHORST, JOS. CO., 1016-20 W. 6th St., Cincinnati, Ohio...*p. 654*
KOVEN, L. O. & BROTHER, 154 Ogden Ave., Jersey City, N. J...*p. 605*
LASKER IRON WORKS, 3201 So. Lincoln St., Chicago, Ill...*p. 655*
MORRISON BROS., Dubuque, Iowa...*p. 658*
NEWBURGH STEAM BOILER WORKS (P. Delany & Co.), Newburgh, N. Y...*p. 64*
*SCAIFE, WM. B. & SONS CO., Oakmont, Pa...*pp. 143, 660*
Whitney-McDonald Co., 2320 E. Tioga St., Philadelphia, Pa.
Wildex Co., Richmond, Ind.
Wood, John Mfg. Co., Conshohocken, Pa.

TAPPING ATTACHMENTS
Bicknell-Thomas Co., Greenfield, Mass.
Errington Mechanical Laboratory, Broadway & John St., New York, N. Y.
LANDIS MACHINE CO. (Inc.), Waynesboro, Pa...*pp. 496, 497*
Leland-Gifford Co., Worcester, Mass.
Peter Brothers' Mfg. Co., Algonquin, Ill.
Procunier, William L., 14 So. Jefferson Ave., Chicago, Ill.
Wahlstrom Tool Co., 5500 2nd Ave., Brooklyn, N. Y.
*WHITNEY MFG. CO. ("Molln"), Hartford, Conn...*p. 495*

TAPPING HEADS
NELSON BLANK MFG. CO., 1662 Dubois St., Detroit, Mich...*pp. 500, 501*

TAPPING MACHINES
Acme Machinery Co., 4533 St. Clair Ave., N. E., Cleveland, Ohio
Allen Machine Co., 1585 Columbus Rd., N. W., Cleveland, Ohio
Anderson Die Machine Co., 544 Iranistan Ave., Bridgeport, Conn.
Baker Brothers, Post & Westlake St., Toledo, Ohio
Bicknell-Thomas Co., Greenfield, Mass.
Boeger-Meyer Machine & Tool Co., 59-65 McWhorter St., Newark, N. J.
Brown, H. B. Co., East Hampton, Conn.
Burke Machine Tool Co., Conneaut, Ohio
Harris, H. E. Engineering Co. ("Harris"), 1017 Broad St., Bridgeport, Conn.
Meriden Machine Tool Co., Meriden, Conn.
National Automatic Tool Co., Richmond, Ind.
Paragon Gear Works ("Tuttle"), Taunton, Mass.
Pipe Machinery Co., 930 E. 70th St., Cleveland, Ohio
Rickert-Shafer Co., 613 W. 11th St., Erie, Pa.
St. Louis Machine Tool Co., 932 Loughborough Ave., St. Louis, Mo.
Smith, A. P. Mfg. Co., East Orange, N. J.
Webster & Perks Tool Co., 300 Center St., Springfield, Ohio

—Bench
Elgin Tool Works, Elgin, Ill.
Partridge, E. O., 2047-2049 W. Lake St., Chicago, Ill.

—Multiple Head
Fox Machine Co., 1807 W. Ganson St., Jackson, Mich.

Ta

Digitized by Google

TAPPING MACHINES (Continued)

—Turret
Paragon Gear Works, ("Tuttle"), Taunton, Mass.
Turner Machine Co, 28-40 Maple Ave., Danbury, Conn.
WOOD TURRET MACHINE CO., Brazil, Ind...*pp. 458, 459*

TAPS AND DIES
Alvord Reamer Tool Co., Millerburg, Pa.
American Tap & Die Co., Greenfield, Mass.
Bath, John & Co. ("Easy Cut"), 8 Grafton St., Worcester, Mass.
Bay State Tap & Die Co., Mansfield, Mass.
Besley, Charles H. & Co. ("Besly"), 118 N. Clinton St., Chicago, Ill.
Brubaker, W. L. & Bros., 50 Church St., New York, N. Y.
Butterfield & Co., Derby Line, Vt.
Card, S. W. Mfg. Co., Rumford Ave., Mansfield, Mass.
Carpenter, J. M. Tap & Die Co., Pawtucket, R. I.
Conant & Donelson Co. ("Reliable"), Conway, Mass.
Elterich, Chas. Co., 180 Lafayette St., New York, N. Y.
Greenfield Tap & Die Corp'n, ("Acorn" "Gun"), Greenfield, Mass.
*LANDIS MACHINE CO. (Inc.), Waynesboro, Pa...*pp. 496, 497*
Morse Twist Drill & Machine Co., New Bedford, Mass.
Murchey Machine & Tool Co., 85 Porter St., Detroit, Mich.
Potter, S. A. Tool & Machine Works, 79 E. 130th St., New York, N. Y.
Pottstown Machine Co., Pottstown, Pa.
PRATT & WHITNEY CO., 111 Broadway, New York, N. Y...*p. 471*
Russell Mfg. Co., Greenfield, Mass.
Standard Tool Co., 6900 Central Avenue, Cleveland, Ohio
Sterling Products Co. (Inc.), 549 Washington Blvd., Chicago, Ill.
Winter Bros. Co., Wrentham, Mass.

TAPS, COLLAPSING
Errington Mechanical Laboratory, Broadway & John St., New York, N. Y.
GEOMETRIC TOOL CO., New Haven, Conn. *pp. 498, 499*
Manufacturers Equipment Co. ("M. E. C."), Waller Ave. & Fillmore St., Chicago, Ill.
Murchey Machine & Tool Co., 85 Porter St., Detroit, Mich.
NATIONAL ACME CO. ("Namco"), Cleveland, Ohio..*pp. 464, 465*
Rickert-Shafer Co., 613 W. 11th St., Erie, Pa.
Victor Tool Co., Waynesboro, Pa.

TAR DISTILLING PLANTS
Koppers, H. Co., 800 Union Arcade, Pittsburgh, Pa.

TELPHERS
(See Tramrail Systems, Overhead)

TEMPERATURE REGULATORS
(See Regulators, Temperature)

TENSION CARRIAGES
*WOOD'S, T. B. SONS CO., Chambersburg, Pa...*pp. 334, 345*

TESTING MACHINES
Emery, A. H., Maple Ave., Glenbrook, Conn.
GRIEBEL INSTRUMENT CO., Carbondale, Pa...*p. 300*
Holz & Co. (Inc.), 17 Madison Ave., New York, N. Y.
OLSEN, TINIUS TESTING MACHINE CO., 500 N. 12th St., Philadelphia, Pa...*pp. 265, 266, 267*
Pittsburgh Instrument & Machine Co., 40 Water St., Pittsburgh, Pa.
RIEHLE BROS. TESTING MACHINE CO., 1424 N. 9th St., Philadelphia, Pa...*p. 268*

TEXTILE FINISHING MACHINERY
Hunt, Rodney Machine Co., Orange, Mass.

TEXTILE MACHINERY
BARBER-COLMAN, Rockford, Ill...*pp. 474, 475*
Curtis & Marble Machine Co., 78 Cambridge St., Worcester, Mass.
DAVIS & FURBER MACHINE CO., North Andover, Mass...*p. 642*
Eastwood, Benjamin Co., 300 Straight St., Paterson, N. J.
FRANKLIN MACHINE CO., P. O. Address Box 1393, Providence, R. I...*p. 9*
Lyall, J. & W. Loom & Machine Co., Passaic, N. J.
Perkins, Henry F., 46 Walnut Ave., Andover, Mass.
*PHILADELPHIA DRYING MACHINERY CO., 3351 Stokeley St., Philadelphia, Pa. *p. 610*
Rice, Barton & Fales Machine & Iron Co., Worcester, Mass.
Tillotson Humidifier Co., Providence, R. I.
Trump Bros. Machine Co. ("Nye & Tredick"), Beech & Anchorage Sts., Wilmington, Del.
Universal Winding Co., Boston, Mass.
Whitin Machine Works, Whitinsville, Mass.

THERMOCOUPLES
BROWN INSTRUMENT CO. ("Brown"), Philadelphia, Pa...*p. 292*
*FOXBORO CO. (Inc.), Foxboro, Mass...*p. 293*
Thwing Instrument Co., 3339 Lancaster Ave., Philadelphia, Pa.

THERMOMETERS
AMERICAN STEAM GAUGE & VALVE MFG. CO., Boston, Mass...*p. 200, 201*
Berg, James Mfg. Co., 3707 12th Ave., Brooklyn, N. Y.
*BRISTOL CO., Waterbury, Conn...*p. 291*
BROWN INSTRUMENT CO. ("Brown"), Philadelphia, Pa...*p. 292*
Burr Co., Champaign, Ill.
*CROSBY STEAM GAGE & VALVE CO., 40 Central St., Boston, Mass...*pp. 202, 208*
Defender Automatic Regulator Co., 709 Pine St., St. Louis, Mo.
Green, Henry J., 1191 Bedford Ave., Brooklyn, N. Y.
GRIEBEL INSTRUMENT CO., Carbondale, Pa...*p. 300*
HAYS, JOS. W. CORP'N. Michigan City, Ind...*p. 282*
MOTO-METER CO. (Inc.), Long Island City, N. Y...*p. 294*
National Gauge Co., 300 Pacific St., Brooklyn, N. Y.
National Gauge & Equipment Co., 58 East 42nd St., New York, N. Y.
Palmer Co., 114-116 West 6th St., Cincinnati, Ohio
Philadelphia Thermometer Co., 24 N. 9th St., Philadelphia, Pa.
PIERCE, BUTLER & PIERCE MFG. CORPN., 437 East 162nd St., New York, N. Y...*p. 204*
*POWERS REGULATOR CO., 995 Architects Bldg., New York, N. Y...*pp. 222, 223*
Precision Thermometer & Instrument Co., 1434 Brandywine St., Philadelphia, Pa.
Queen-Gray Co., 616-620 Chestnut St., Philadelphia, Pa.
*SCHAEFFER & BUDENBERG MFG. CO. ("Crescent"), Brooklyn, N. Y...*p. 295*
Standard Thermometer Co., 65 Shirley St., Boston, Mass.

Digitized by Google

TAGLIABUE, C. J. MFG. CO., 18-88 33rd St., Brooklyn, N. Y...*p. 296*
Wagner, Carl H., 1944 W. Albany Ave., Chicago, Ill
Weinhagen & Hespe, 159-165 Leonard St., New York, N. Y.

—Distance (Electric Resistance)
*BRISTOL CO., Waterbury, Conn...*p. 291*
BROWN INSTRUMENT CO. (''Brown''), Philadelphia, Pa...*p. 292*
Wagner, Carl H., 1944 W. Albany Ave., Chicago, Ill.

—Distance, (Vapor Tension)
MOTO-METER CO. (Inc.), Long Island City, N. Y...*p. 294*
National Gauge & Equipment Co., 53 E. 42nd St., New York, N. Y.

—Electric
Thwing Instrument Co., 3339 Lancaster Ave., Philadelphia, Pa.

—High Range
BROWN INSTRUMENT CO. (''Brown''), Philadelphia, Pa...*p. 292*
*FOXBORO CO. (Inc.), Foxboro, Mass...*p. 293*
*SCHAEFFER & BUDENBERG MFG. CO., Brooklyn, N. Y...*p. 295*
Taylor Instrument Cos. (''Tycos''), Rochester, N. Y.

THERMOSTATIC METALS
(See Metals, Thermostatic)

THERMOSTATS
American Thermostat Co., 226 Jelliff Ave., Newark, N. J.
Atlas Valve Co., 282-286 South St., Newark, N. J.
Automatic Reclosing Circuit Breaker Co., 6th & Wesley Aves., Columbus, Ohio
Beers Bros. Thermostat Co., Rochester, N. Y.
Bishop & Babcock Co., E. 49th & Hamilton Ave., Cleveland, Ohio
*BRISTOL CO., Waterbury, Conn...*p. 291*
BROWN INSTRUMENT CO. (''Brown''), Philadelphia, Pa...*p. 292*
Consolidated Car-Heating Co., 413 N. Pearl St., Albany, N. Y.
D'ESTE, JULIAN CO., 26 Canal St., Boston, Mass...*pp. 206, 207*
Equitherm Control Corp'n, 13 Tillary St., Brooklyn, N. Y.
FULTON CO. (''Sylphon''), Knoxville, Tenn. *pp. 218, 219.*
*GENERAL ELECTRIC CO., Schenectady, N. Y...*pp. 18, 19, 20, 21*
Jewell Mfg. Co., 27 Clark St., Auburn, N. Y.
JOHNSON SERVICE CO., Wilwaukee, Wis. *pp. 220, 221*
Klipfel Mfg. Co., 2651 W. Harris St., Chicago, Ill.
National Regulator Co., 200 S. Jefferson St., Chicago Ill.
*POWERS REGULATOR CO., 995 Architects Bldg., New York, N. Y...*pp. 222, 223*
Roys' Heat Control Co., 915 Gates Ave., Brooklyn, N. Y.
*SARCO CO. (Inc.), 9 Barclay St., New York, N. Y...*pp. 224, 225*
Standard Regulator Co., 282 South St., Newark, N. J.
TAGLIABUE, C. J. MFG. CO., 18-88 33rd St., Brooklyn, N. Y...*p. 296*

—Electric
American Thermostat Co., 226 Jelliff Ave., Newark, N. J.
JOHNSON SERVICE CO., Wilwaukee, Wis. *pp. 220, 221*

—Pneumatic
JOHNSON SERVICE CO., Wilwaukee, Wis. *pp. 220, 221*
*POWERS REGULATOR CO., 995 Architects Bldg., New York, N. Y...*pp. 222, 223*

THICKENERS
Dorr Co., Inc., 101 Park Ave., New York, N. Y.

THREAD CUTTING TOOLS
(See Tools, Thread Cutting)

THREADING MACHINES
GEOMETRIC TOOL CO., New Haven, Conn. *pp. 498, 499*

—Bolt
Eastern Machine Screw Corp'n, New Haven, Conn.
GEOMETRIC TOOL CO., New Haven, Conn. *pp. 498, 499*
*LANDIS MACHINE CO. (Inc.), Waynesboro, Pa...*pp. 496, 497*
NATIONAL ACME CO. (''Namco''), Cleveland, Ohio...*pp. 464, 465*
Rickert-Shafer Co., 613 W. 11th St., Erie, Pa.
Universal Machine Co., Bowling Green, Ohio
Webster & Perks Tool Co., 300 Center St., Springfield, Ohio

—Pipe
*LANDIS MACHINE CO. (Inc.), Waynesboro, Pa...*pp. 496, 497*
McMann & Taylor Co., 104-106 John St. New York, N. Y.
Pipe Machinery Co., 930 E. 70th St., Cleveland, Ohio

—Sheet Metal
*LANDIS MACHINE CO. (Inc.), Waynesboro, Pa...*pp. 496, 497*
Leffler, Charles & Co., 49-73 Clymer St., Brooklyn, N. Y.
V. & O. Press Co., Glendale, Brooklyn, N. Y.

TICKET CANCELLING MACHINES
*INGERSOLL-RAND CO., 11 Broadway, New York, N. Y...*pp. 546, 547*

TIERING MACHINES, PORTABLE
Economy Engineering Co., 415 S. Washtenaw Ave., Chicago, Ill.
Lewis-Shepard Co., 568 E. First St., Boston, Mass.
Revolvator Co., 344 Garfield Ave., Jersey City, N. J.

TIE WORKING MACHINES (Railway)
Greenlee Bros. & Co., Rockford, Ill.

TIES, STEEL (Mine)
Fairmont Mining Machinery Co., Fairmont, W. Va.

TILE MAKING MACHINERY
BONNOT CO., Canton, Ohio...*p. 598*
Crossley Machine Co., State & Monmouth Sts., Trenton, N. J.
Freese, E. M. & Co., 180 South St., Galion, Ohio

TILES
—Asphalt
HASTINGS PAVEMENT CO., 25 Broad St., New York, N. Y...*p. 661*

—Boiler Baffle
Taylor, Charles Sons Co., 706 Burns St., Cincinnati, Ohio

—Fire
Hoffman, Chas. V., Co. (Inc.), 95 Liberty St., New York, N. Y.
Maurer, Henry & Son, 420 E. 23rd St., New York, N. Y.

—Hollow (Fireproof)
Maurer, Henry & Co., 420 E. 23rd St., New York, N. Y.

Ti

Digitized by Google

TIME RECORDERS
Baird Equipment Co., 319-325 W. Ohio St., Chicago, Ill.
*BRISTOL CO., Waterbury, Conn...*p. 291*
BROWN INSTRUMENT CO. (''Brown''), Philadelphia, Pa...*p. 292*
*FOXBORO CO. (Inc.), Foxboro, Mass...*p. 293*
Newman Clock Co. (Inc.), 428- 430 Broadway, New York, N. Y.
*SCHAEFFER & BUDENBERG MFG. CO., Brooklyn, N. Y...*p. 295*
Simplex Time Recorder Co. (''Simplex''), Gardner, Mass.

TIN FOIL MACHINERY
Birmingham Iron Foundry, Derby, Conn.

TIN PIPE MACHINERY
ROBERTSON, JOHN & CO., 133 Water St., Brooklyn, N. Y...*p. 595*

TINPLATE MACHINERY
Aetna Foundry & Machine Co., Warren, Ohio

TINPLATES
American Sheet & Tin Plate Co., Frick Bldg., Pittsburgh, Pa.
Inland Steel Co., 1105 First National Bank Bldg., Chicago, Ill.
LaBelle Iron Works, Steubenville, Ohio

TINSMITHS' MACHINES
BERTSCH & CO., Cambridge City, Ind...*p. 442*
Dreis Krump Mfg. Co., 2919 So. Halsted St., Chicago, Ill.
NIAGARA MACHINE & TOOL WORKS, Buffalo, N. Y...*p. 443*

TINWARE MACHINERY
BERTSCH & CO., Cambridge City, Ind...*p. 442*
*BLISS, E. W. CO., 19 Adams St., Brooklyn, N. Y...*pp. 438, 439*
Leffler, Charles & Co., 49-73 Clymer St., Brooklyn, N. Y.

TIRE FACTORY EQUIPMENT
Williams Foundry & Machine Co., Akron, Ohio

TIRE SETTING MACHINES (Hydraulic)
West Tire Setter Co., Rochester, N. Y.

TIRES, LOCOMOTIVE
Railway Steel Spring Co., 30 Church St., New York, N. Y.
Edgewater Steel Co., Farmers Bank Bldg., Pittsburgh, Pa.

TOBACCO MACHINERY
American Machine & Foundry Co., 5520 Second Ave., Brooklyn, N. Y.
Miller, DuBrul & Peters Mfg. Co., 507-521 E. Pearl St., Cincinnati, Ohio

TONGS
—Crane
Kenworthy, Charles F. (Inc.), Waterbury, Conn.
—Crucible and Pan
NEW JERSEY FOUNDRY & MACHINE CO., 90 West St., New York, N. Y...*p. 396*

TOOL POSTS
WILLIAMS, J. H. & CO., 70 Richards St., Brooklyn, N. Y...*p. 517*
—Turret
McCrosky Tool Corp'n, (''McCrosky''), Meadville, Pa.
Phoenix Mfg. Co., Eau Claire, Wis.

TOOLS
—Balancing
Rockford Tool Co., Rockford, Ill.
—Boiler Makers'
Helwig Mfg. Co., St. Paul, Minn.
MARCHANT, GEO. F. CO., 1420-28 S. Rockwell St., Chicago, Ill...*p. 505*
—Boring
Davis Boring Tool Co. (''Davis''), 3722 Forest Park Blvd., St. Louis, Mo.
Hall Mfg. Co., Abington, Mass.
Kelly Reamer Co., 3705 W. 73rd St., Cleveland, Ohio
Lovejoy Tool Company, (Inc.), Springfield, Vt.
Madison Mfg. Co., Spring & Elton Sts., Muskegon, Mich.
Marvin & Casler Co., Canastota, N. Y.
PORTER-CABLE MACHINE CO., Syracuse, N. Y...*p. 460*
Rickert- Shafer Co., 613 W. 11th St., Erie, Pa.
Rogers, John M., Works, (Inc.), Gloucester City, N. J.
Schellenbach-Hunt Tool Co., 116-124 Opera Place, Cincinnati, Ohio
Underwood, H. B. Corp'n, 1025 Hamilton St., Philadelphia, Pa.
Union Tool Co., Orange Mass.
—Boring (Adjustable and Expansion)
Davis Boring Tool Co. (''Davis''), 3722 Forest Park Blvd., St. Louis, Mo.
WILLIAMS, J. H. & CO., 70 Richards St., Brooklyn, N. Y...*p. 517*
—Broaching
Lapointe, J. N. Co., New London, Conn.
Lapointe Machine Tool Co., Hudson, Mass.
VELCO MFG. CO. (Inc.), Greenfield, Mass. *p. 461*
—Diamond
Dessau, Maurice S., 6 Maiden Lane, New York, N. Y.
Diamond Drill Carbon Co., 61 Park Row, New York, N. Y.
—Diamond Pointed
Diamond Drill Carbon Co., 61 Park Row, New York, N. Y.
—Inspection
Taft-Peirce Mfg. Co., Woonsocket, R. I.
—Lathe
Armstrong Bros. Tool Co., 333 N. Francisco Ave., Chicago, Ill.
Haynes Stellite Co., 30 E. 42nd St., New York, N. Y.
Lovejoy Tool Company, (Inc.), Springfield, Vt.
Union Tool Co., Orange, Mass.
WILLIAMS, J. H. & CO., 70 Richards St., Brooklyn N. Y...*p. 517*
—Machinists' Small
Athol Machine & Foundry Co., Athol, Mass.
Billings & Spencer Co., Hartford, Conn.
BROWN & SHARPE MFG. CO., Providence, R. I...*p. 477*
CLEVELAND TWIST DRILL CO., Cleveland, Ohio...*p. 502*
Goodell-Pratt Co., Greenfield, Mass.
Johansson, C. E. (Inc.), Poughkeepsie, N. Y.
Modern Tool & Machine Works, (Inc.), 344-350 Mulberry St., Newark, N. J.
Plumb, Fayette R., Bridesburg, P. O., Philadelphia Pa.
PRATT & WHITNEY CO., 111 Broadway, New York, N. Y...*p. 471*
Quick Change Chuck Mfg. Co., 818 E. Monument Ave., Dayton, Ohio
Riddell Bros., (Inc.), 340 Whitehall St., Atlanta, Ga.
Slocomb, J. T. Co., 35 Oxford St., Providence, R. I.
Stanley Rule & Level Plant, The Stanley Works, New Britain, Conn.

Digitized by Google

*STARRETT, L. S. CO., Athol, Mass...*p. 508*
Union Tool Co., Orange, Mass.
WILLIAMS, J. H. & CO., 70 Richards St., Brooklyn, N. Y...*p. 517*

—Oil Well Drilling
Hughes Tool Co., Houston, Texas
JARECKI MFG. CO., Erie, Pa...*pp. 178, 179*
Union Tool Co., Torrance, Cal.

—Planer
WILLIAMS, J. H. & CO., 70 Richards St., Brooklyn, N. Y...*p. 517*

—Plate Workers
MARCHANT, GEO. F. CO., 1420-28 S. Rockwell St., Chicago, Ill...*p. 505*
Richards, I. P., Co., 23 Pemberton St., Providence, R. I.

—Pneumatic
Canton Pneumatic Tool Co., Canton, Ohio
CHICAGO PNEUMATIC TOOL CO. (''Boyer'') (''Little Giant''), 6 E. 44th St., New York, N. Y...*p. 548*
Dallett, Thomas H. Co., Broad & Federal Sts., Philadelphia, Pa.
Dayton Pneumatic Tool Co., Dayton, Ohio
Duntley-King Pneumatic Tool Co., 1143-45 Diversey Parkway, Chicago, Ill.
Helwig Mfg. Co., St. Paul, Minn.
*INGERSOLL RAND CO. (''Little David''), 11 Broadway, New York, N. Y...*pp. 540, 547*
Keller Pneumatic Tool Co., Grand Haven, Mich.
Kotten Machine Co., West Side Ave. & Penn R. R., Jersey City, N. J.
Oldham, George & Son Co., 4316-22 Tackawanna St., Frankford, Philadelphia, Pa.

—Roll
Tinker, F. & Sons Co., Butler St. at 57th Arsenal Sta., Pittsburgh, Pa.

—Rubber Workers'
HOGGSON & PETTIS MFG. CO., New Haven, Conn...*pp. 512, 513, 514*

—Saw Fitting
Wardwell Mfg. Co., 110-112 Hamilton Ave., Cleveland, Ohio

—Sheet Metal Workers
Helwig Mfg. Co., St. Paul, Minn.

—Special
American Machine Products Co., 18th & Howard Sts., Detroit, Mich.
Blair Tool and Machine Works, (Inc.), 515 Greenwich St., New York, N. Y.
Boeger-Meyer Machine & Tool Co., 59-65 McWhorter St., Newark, N. J.
Buckeye Twist Drill Co., Alliance, Ohio
BURROUGHS, CHARLES CO. (The), Newark, N. J...*p. 590*
Cowdrey, C. H., Machine Works, 20 Main St., Fitchburg, Mass.
Davie Tool Co., 1662 E. 118th St., Cleveland, Ohio
Detroit Reamer & Tool Co., 302 Congress St., E., Detroit, Mich.
Diamant Tool & Mfg. Co. (Inc.), 91-97 Runyon St., Newark, N. J.
DOVE-SMITH & SON, Niagara Falls, N. Y. *p. 492*
Driggs Ordance & Mfg. Co., 149 Broadway, New York, N. Y.
Elterich, Chas. Co., 180 Lafayette St., New York, N. Y.
Johnson & Biddle Tool Co., 312-14 N. Main St., Elkhart, Ind.
Lincoln Machine Co., 1068 Main St., Pawtucket, R. I.
Meldrum-Gabrielson Corp'n, Syracuse, N. Y.
Marvin, W. B. Mfg. Co., Urbama, Ohio
Mehl Machine Tool & Die Co. (''Mehl Made''), Roselle, N. J.
Michigan Tool Co., 404 E. Jefferson Ave., Detroit, Mich.
Modern Mfg. Co., 75 Third St., Bridgeport Conn.
NATIONAL TOOL CO. (''National Cleveland''), Cleveland, Ohio...*p. 504*
Production Tool & Engrg. Co., 507 W. Jackson Blvd., Chicago, Ill.
Shields Cutter Co., 18511 Euclid Ave., Cleveland, Ohio
Smith, R. G. Tool & Mfg. Co., 315 Market St., Newark, N. J.
Taft-Peirce Mfg. Co., Woonsocket, R. I.
Ulmer, J. C. Co., 1791 E. 38th St., Cleveland, Ohio
Waltham Machine Works, Waltham, Mass.

—Structural Workers
Cleveland Steel Tool Co., 660 E. 82nd St., Cleveland, Ohio
MARCHANT, GEO. F. CO., 1420-28 S. Rockwell St., Chicago, Ill...*p. 505*

—Thread Cutting
Bay State Tap & Die Co., Mansfield, Mass.
Borden Co. (''Beaver''), Warren, Ohio
Hart Mfg. Co., 2315 E. 20th St., Cleveland, Ohio
JARECKI MFG. CO., Erie, Pa...*pp. 178, 179*
*JONES & LAMSON MACHINE CO., Springfield, Vt...*pp. 450, 451, 452, 453, 454*
*LANDIS MACHINE CO. (Inc.), Waynesboro, Pa...*pp. 496, 497*
Modern Tool Co., Erie, Pa.
PRATT & WHITNEY CO., 111 Broadway, New York, N. Y...*p. 471*
Wicaco Screw and Machine Works, (Inc.), N. E. Cor. 7th & Wood Sts., Philadelphia, Pa.
WILLIAMS, J. H. & CO., 70 Richards St., Brooklyn, N. Y...*p. 517*

—Valve Reseating
Draper Mfg. Co., 2417 Wright St., Port Huron, Mich.
Furness Bros. Co. (''F. B. C.''), 1615 W. Walnut St., Chicago, Ill.
LEAVITT MACHINE CO., Orange, Mass. *pp. 198, 199*
Skinner, M. B. Co. (''Skinner''), 562 Washington Boul., Chicago, Ill.

—Wood Working
Greenlee Bros. & Co., Rockford, Ill.
Stanley Rule & Level Co., New Britain, Conn.
*STARRETT, L. S. CO., Anthol, Mass...*p. 508*

TORCHES
Gem Mfg Co., 1229-43 Goebel St., N. S., Pittsburgh, Pa.
Lippold Valve Co., Erie, Pa.

—Gas
ANTHONY CO., 138 West Ave., Long Island City, N. Y...*p. 530*
North American Mfg. Co., 5902 Carnegie Ave., Cleveland, Ohio

—Kerosene
ANTHONY CO., 138 West Ave., Long Island City, N. Y...*p. 530*
Hauck Mfg. Co., 127 Tenth St., Brooklyn, N. Y.
SMITH'S INVENTIONS, (Inc.), 2636 4th St., S. E., Minneapolis, Minn...*p. 541*

—Oil Burning
ANTHONY CO., 138 West Ave., Long Island City, N. Y...*p. 530*
Mahr Mfg. Co., 1300 N. E. Quincy St., Minneapolis, Minn.

—Welding and Cutting
BASTIAN-BLESSING CO. (''Rego''), 125 W. Austin Ave., Chicago, Ill...*p. 539*
MILBURN, ALEXANDER CO. (The), Baltimore, Md...*p. 540*
SMITH'S INVENTIONS, (Inc.), 2636 4th St., S. E., Minneapolis, Minn...*p. 541*

To

Digitized by Google

TOTE BOXES
(See Boxes, Tote)

TRACING PAPER & CLOTH
Aloe, A. S. Co., 513 Olive St., St. Louis, Mo.
Dietzgen, Eugene Co., Chicago, Ill.
Keuffel & Esser Co., Hoboken, N. J.
Makepeace, B. L., Inc., 387 Washington St., Boston, Mass.
PEASE, C. F. CO., 843 N. Franklin St., Chicago, Ill...*p. 664*
Soltmann, E. G. (Inc.), 202 E. 42nd St., New York, N. Y.
Special Fabrics Co., Saylesville, R. I.
Vincent, George, 422 E. 53rd St., New York, N. Y.
Weil, J. H. & Co., 1300 Arch St., Philadelphia, Pa.

TRACK
—Cast Iron Plate
Easton Car & Construction Co., Rm. 679, 50 Church St., New York, N. Y.
*HUNT, C. W. CO. (Inc.), West New Brighton, Staten Island, N. Y...*pp. 374, 375*
—Industrial Railway
Chase Foundry & Mfg. Co., Columbus, Ohio
Easton Car & Construction Co., Rm. 679, 50 Church St., New York, N. Y.
*HUNT, C. W. CO. (Inc.), West New Brighton, Staten Island, N. Y...*pp. 374, 375*
Koppel Industrial Car & Equipment Co., Koppel, Beaver Co., Pa.
Sackett Screen & Chute Co., H. B., 1679-1691 Elston Ave., Chicago, Ill.
Simplex Surface Contact Co., Williamsport, Pa.
Turl Iron & Car Co. (Inc.), 50 Broad St., New York, N. Y.
*WASHBURN & GRANGER (Inc.), 50 Church St., New York, N. Y...*p. 127*
—Overhead
*BROWN HOISTING MACHINERY CO., Cleveland, Ohio..*p. 390*
MARIS BROS. (Inc.), 5546 Grays Ave., Philadelphia, Pa...*p. 395*
*SHEPARD ELECTRIC CRANE & HOIST CO., Montour Falls, N. Y...*pp. 400, 401*
Ricker Mfg. Co., Rochester, N. Y.

TRACK WORK
Weir Frog Co., Sta. H., Cincinnati, Ohio

TRACTOR PARTS (Pressed Steel)
Federal Pressed Steel Co., Milwaukee, Wis.

TRACTORS
—Farm
*ALLIS-CHALMERS MFG. CO., Milwaukee, Wis...*pp. 28, 29*
Avery Co., Peoria, Ill.
Buckeye Mfg. Co. ("Trundaar"), Anderson, Ind.
Case, J. C. Co. ("Wallis"), Racine, Wis.
Case, J. I. Threshing Machine Co., Racine, Wis.
Cleveland Tractor Co., Cleveland, Ohio
Eagle Mfg. Co., Appleton, Wis.
FAIRBANKS, MORSE & CO., 900 S. Wabash Ave., Chicago, Ill...*p. 41*
Galoway, Wm. Co., Waterloo, Ia.
Granger, A. D. Co. ("Utilitor"), 15 Park Row, New York, N. Y.
Hart-Parr Co., Charles City, Iowa
Hettinger Engine Co., Bridgeton, N. J.
Holt Mfg. Co., Stockton, Cal.
Imperial Machine Co. ("Imperial Forty"), 1611 Central Ave., Minneapolis, Minn.
Lauson, John Mfg. Co., New Holstein, Wis.
Minneapolis Steel & Machinery Co., 9th & Minnehaha Ave., Minneapolis, Minn.
National Tractor Co., Cedar Rapids, Ia.
NEW BRITAIN MACHINE CO., New Britain, Conn...*p. 463*
Olin Gas Engine Company, 10 Lock St., Buffalo, N. Y.
Reliable Tractor & Engine Co. ("Reliable"), Portsmouth, Ohio
Russell & Co., 814 S. Erie St., Massillon, Ohio
Staude, E. G. Mfg. Co., 2675 University Ave., St. Paul, Minn.
West Coast Steel Co., 21st & Pacific Sts., Tacoma, Wash.
Yuba Mfg. Co., Marysville, Calif.
—Industrial
Best, C. L., Gas Traction Co., San Leauro, Cal.
Clark Tructractor Co., Buchanan, Mich.
Cleveland Tractor Co., Cleveland, Ohio
Cowan Truck Co., Water St., Holyoke, Mass.
Eagle Mfg. Co., Appleton, Wis.
Farquhar, A. B. Co., Ltd., York, Pa.
Lakewood Engineering Co., Cleveland, Ohio
Towmotor Co., 1226 East 152nd St., Euclid, Ohio
Turner Mfg. Co., Port Washington, Wis.
Warren & Irrgang Co., Springfield, Mass.
—Industrial (Storage Battery)
Automatic Transportation Co., Buffalo, N. Y.
BAKER, R. & L. CO ..,Cleveland, Ohio...*p. 382*
Crescent Truck Co., 347-349 1st Ave., Elizabeth, N. J.
Mercury Mfg. Co., 4118 Halsted St., Chicago, Ill.
*YALE & TOWNE MFG. CO., Stamford, Conn...*p. 405*
—Roller
Galion Iron Works & Mfg. Co., Galion, Ohio

TRAILERS
—Industrial
Crescent Truck Co., 437-439 1st Ave., Elizabeth, N. J.
Mercury Mfg. Co., 4118 Halsted St., Chicago, Ill.
*YALE & TOWNE MFG. CO., Stamford, Conn...*p. 405*
—Track Laying
Gray Aldrich Co. (Inc.), 84 Atlantic Ave., Boston, Mass.

TRAMRAIL SYSTEMS (Overhead)
BOX, ALFRED & CO. (Inc.), Philadelphia, Pa...*p. 394*
BROWN HOISTING MACHINERY CO., Cleveland, Ohio..*p. 390*
Cameron Engineering Co., East Stroudsburg, Pa.
Coburn Trolley Track Mfg. Co., Holyoke, Mass.
Detroit Hoist & Machine Co., 8201 Morrow St., Detroit, Mich.
Granger, A. D. Co., 15 Park Row, New York, N. Y.
Louden Machinery Co., Fairfield, Iowa
MARIS BROS. (Inc.), 5546 Grays Ave., Philadelphia, Pa...*p. 395*
MORRIS, HERBERT (Inc.), 1-15 Lawrence Place, Buffalo, N. Y...*p. 402*
NEW JERSEY FOUNDRY & MACHINE CO., 90 West St., New York, N. Y...*p. 396*
Philadelphia Tramrail Co., Front & Indiana Ave., Philadelphia, Pa.
Randall Tramrail Co., 331 N. 2nd St., Philadelphia, Pa.
Richards-Wilcox Mfg. Co., Aurora, Ill.
*SHEPARD ELECTRIC CRANE & HOIST CO., Mountour Falls, N. Y...*pp. 400, 401*
Wagner Mfg. Co., Cedar Falls, Iowa
Whiting Corp'n., Harvey Ill.
Winterhoff Tool & Machine Co., Elkhart, Ind.

Digitized by Google

TRAMWAYS (Wire Rope)
American Steel & Wire Co., 72 W. Adam St., Chicago, Ill.
Broderick & Bascom Rope Co., 76 Warren St., New York, N. Y.
Leschen, A. & Sons Rope Co., St. Louis, Mo.
MacWhyte Co., Kenosha, Wis.
United States Steel Products Co., 4th Ave. & Connecticut St., Seattle, Wash.
Universal Conveyor Co., 628 J. M. S. Bldg., So. Bend, Ind.

TRANSFER TABLES
INDUSTRIAL WORKS, Bay City, Mich...*pp. 392, 393*

TRANSFORMERS ELECTRIC
*ALLIS-CHALMERS MFG. CO., Milwaukee, Wis...*pp 28, 29*
Eveland Electric Riveter Co., West End Trust Bldg., Philadelphia, Pa.
*GENERAL ELECTRIC CO., Schenectady, N. Y...*pp. 18, 19. 20, 21*
Wagner Electric Mfg. Co., 6400 Plymouth Ave., St. Louis, Mo.
WESTINGHOUSE ELECTRIC & MFG. CO., East. Pittsburgh, Pa...*pp. 160, 161*

TRANSMISSION MACHINERY
(See Power Transmission Machinery)

TRANSMISSIONS
—Automobile
Brown-Lipe Gear Co., 1117 W. Fayette St., Syracuse, N. Y.
Detroit Gear & Machine Co., 670 Woodbridge St., Detroit, Mich.
Grant-Lees Gear Co., 2367 E. 69th St., Cleveland, Ohio
Lippincott-Carwen Corp'n., Erie Ave. & Richmond Sts., Philadelphia, Pa.
New York Gear Works, 56 Greenpoint Ave., Brooklyn, N. Y.
Warner Gear Co, Muncie, Ind.
Warren Gear Products Co., Warren, Pa.
—Hydraulic
OILGEAR CO., 60-62-64 27th St., Milwaukee, Wis...*p. 483*
Waterbury Tool Co., Waterbury, Conn.
—Marine
Paragon Gear Works ("Paragon"), Taunton, Mass
—Tractor
*FOOT BROS. GEAR & MACHINE CO., 2134 N. Curtis St., Chicago, Ill...*pp. 308, 309*
—Truck
Warren Gear Products Co., Warren, Pa.
—Variable Speed
Moore & White Co., Philadelphia, Pa
OILGEAR CO., 60-62-64-27th St., Milwaukee, Wis...*p. 483*
REEVES PULLEY CO., Columbus, Ind...*p. 319*
Weiss Engineering Co., 17 Battery Place, New York, N Y.
Yocom, Jas. & Son, 145 N. 2nd St., Philadelphia, Pa.

TRAP ATTACHMENTS
Flinn, Richard J., W. Roxbury, Boston, 32, Mass.

TRAPS
—Blast
DUNHAM, C. A. CO., 230 East Ohio St., Chicago, Ill...*p. 227*
—Comoressed Air
FISHER GOVERNOR CO., Marshalltown, Iowa..*p. 208*
Nicholson, W. H. & Co., 12 Oregon St., Wilkes-Barre, Pa.
—Condenser
Morehead Mfg. Co., 1011 Grand River Ave., Detroit, Mich.
—Drip
DUNHAM, C. A. CO., 230 East Ohio St., Chicago, Ill...*p. 227*
—Oil
Armstrong Machine Works, Three Rivers, Mich.
WEBSTER, WARREN & CO., Camden, N. J. ..*pp. 154, 155*
—Pumping
Nashua Machine Co. (Inc.), 39 Elm St., Nashua, N. H.
—Radiator
D. G. C. Trap & Valve Co., 18 E. 41st St., New York, N. Y.
DUNHAM, C. A. CO., 230 East Ohio St., Chicago, Ill...*p. 227*
*JOHNS-MANVILLE (Inc.), New York, N. Y...*p. 244*
Marsh, Jas. P. & Co. ("Refluv"), 118 S. Clinton St., Chicago, Ill.
Plant Engineering & Equipment Co. (Inc.), 192 Broadway, New York, N. Y.
*SARCO CO. (Inc.) ("Sarco"), 9 Barclay St., New York, N. Y...*pp. 224, 225*
Thermograde Valve Co., Howard St., Watertown, Mass.
Trane Co., 11 John St., New York, N. Y.
Vapor-Vacuum Heating Co., 401 Otis Bldg., Philadelphia, Pa.
WEBSTER, WARREN & CO., Camden, N. J...*pp. 154, 155*
—Return
Albany Steam Trap Co. 317 N. Albany St., Albany, N. Y.
*AMERICAN BLOWER CO., Detroit, Mich. ..*p. 553*
*CRANE CO., 836 S. Michigan Ave., Chicago, Ill...*pp. 170, 171, 172, 173*
D'ESTE JULIAN CO., 26 Canal St., Boston, Mass...*pp. 206, 207.*
DUNHAM, C. A. CO., 230 East Ohio St., Chicago, Ill...*p. 227*
Ellis Drier Co., Roosevelt Road & Talman Ave., Chicago, Ill.
*ILLINOIS ENGINEERING CO. ("Eclipse"), Chicago Ill...*pp. 210, 211*
*KIELEY & MUELLER (Inc.) ("Kieley"), 34 W. 13th St., New York, N. Y...*p. 212*
Nashua Machine Co. (Inc.), 39 Elm St., Nashua, N. H.
Plant Engineering & Equipment Co. (Inc.), 192 Broadway New York, N. Y.
Roys' Heat Control Co., 915 Gates Ave., Brooklyn, N. Y.
Templeton Mfg. Co., Hyde Park, Mass.
—Steam
Albany Steam Trap Co., 317 N. Pearl St., Albany, N. Y.
*AMERICAN BLOWER CO., Detroit, Mich. *p. 553*
AMERICAN DISTRICT STEAM CO. ("Empire" "American"), North Tonawanda, N. Y...*p. 242*
AMERICAN STEAM GAUGE & VALVE MFG. CO. ("American Ideal"), Boston, Mass...*pp. 200, 201*
Anderson, V. D. Co., 1953 W. 96th St., Cleveland, Ohio
Armstrong Machine Works, Three Rivers, Mich.
Barton, John W., 2707 Vestry Ave., Cleveland, Ohio
Boylston Steam Specialty Co., 116 W. Illinois St., Chicago, Ill.
Burrows Mfg. Co., 41-43 N. Water St., York, Pa.
*CRANE CO., 836 S. Michigan Ave. Chicago, Ill...*pp. 170, 171, 172, 173*

Tr

Digitized by Google

TRAPS (Continued)

D. G. O. Trap & Valve Co., 18 E. 41st St., New York, N. Y.
Davis, G. M. Regulator Co., 439 Milwaukee Ave., Chicago, Ill.
D'ESTE, JULIAN CO., 26 Canal St., Boston, Mass...*pp. 206, 207*
Ellis Drier Co., Roosevelt Road & Talman Ave., Chicago, Ill.
FISHER GOVERNOR CO. ("Fisher"), Marshalltown, Iowa..*p. 219*
Flinn, Richard J., W. Roxbury, Boston, 32, Mass.
Foskett & Bishop Co., New Haven, Conn.
*H. S. B. W.-COCHRANE CORP'N., Phila., Pa...*pp. 146, 147*
Hoffman Specialty Co., Waterbury, Conn.
*ILLINOIS ENGINEERING CO. (Eclipse), Chicago, Ill...*pp. 210, 211*
*JENKINS BROS., 80 White St., New York, N. Y...*pp. 180, 181*
*JOHNS-MANVILLE (Inc.), New York, N. Y...*p. 244*
*KIELEY & MUELLER (Inc.) ("Kieley"), 34 W. 13th St., New York, N. Y...*p. 212*
Kitts Mfg. Co., Oswego, N. Y.
Kitts Steam Specialty Co., 60 E. 1st St., Oswego, N. Y.
Klipfel Mfg. Co., 2651 W. Harrison St., Chicago, Ill.
Linton Machine Co., 26 Cortlandt St., New York, N. Y.
Locke Regulator Co., 76 North St., Salem, Mass.
Lytton Mfg. Corp'n., Franklin, Va.
McAlear Mfg. Co. 1901 So. Western Ave., Chicago, Ill.
McAuley Automatic Trap Co., Third St. & Penn Ave., Pittsburgh, Pa.
Nashua Machine Co. (Inc.), 39 Elm St., Nashua, N. H.
NASON MFG. CO. ("Nason," "Vesuvius"), 71 Fulton St., New York, N. Y...*p. 216*
Nicholson, W. H. & Co., 12 Oregon St., Wilkes Barre, Pa.
Ohio Body & Blower Co., 9300 Detroit Ave., Cleveland, Ohio
OPEN COIL HEATER & PURIFIER CO., Indianapolis, Ind...*p. 149*
Patterson, Frank L., & Co., 28 Cortlandt St., New York, N. Y.
Plant Engineering & Equipment Co. (Inc.), 192 Broadway, New York, N. Y.
*POWERS REGULATOR CO., 995 Architects Bldg., New York, N. Y...*pp. 222, 223*
Providence Steam Trap Co. ("Newtons"), 16 Diamond St., Providence, R. I.
Reliance Gauge Column Co. ("Reliance"), 5902 Carnegie Ave., Cleveland, Ohio
Robertson, John F. Co., 1001 Park Bldg., Pittsburgh, Pa.
Ross Schofield Co., 17 Battery Place, New York, N. Y.
*SARCO CO. (Inc.), ("Sarco"), 9 Barclay St., New York, N. Y...*pp. 224, 225*
Squires, C. E. Co., E. 40th St. and Kelley Ave., Cleveland, Ohio
Steam Appliance Co., 709 63rd Ave., West Allis, Wis.
Strong, Carlisle & Hammond Co., Cleveland, Ohio
STURTEVANT, B. F. CO., Hyde Park, Boston, Mass...*p. 106*
Templeton Mfg. Co., Hyde Park, Mass.
Tillotson Humidifier Co., Providence, R. I.
Tyler Underground Heating System, 815 S. Canal St., N. S., Pittsburgh, Pa.
Watson & McDaniel Co., 142 N. 7th St., Philadelphia, Pa.
WEBSTER, WARREN & CO., Camden, N. J. ..*pp. 154, 155*
Western Kieley Steam Specialty Co., 116-122 W. Illinois, Chicago, Ill.
Williams, D. T., Valve Co., Spring Grove Ave. and Township St., Cincinnati, Ohio
Williams Gauge Co., 543 Fourth Ave., Pittsburgh, Pa.
Wright-Austin Co., 315 W. Woodbridge St., Detroit, Mich.

—Vacuum

*AMERICAN BLOWER CO., Detroit, Mich. *p. 553*
AMERICAN STEAM GAUGE & VALVE MFG. CO. ("American Ideal"), Boston, Mass...*pp. 200, 201*
Armstrong Machine Works, Three Rivers, Mich.
Barton, John W., 2707 Vestry Ave., Cleveland, Ohio
*CRANE CO., 836 S. Michigan Ave., Chicago, Ill...*pp. 170, 171, 172, 173*
Ellis Drier Co., Roosevelt Road & Talman Ave., Chicago, Ill.
Flinn, Richard J., W. Roxbury, Boston, 32, Mass.
Morehead Mfg. Co., 1041 Grand River Ave., Detroit, Mich.
Nashua Machine Co. (Inc.), 39 Elm St., Nashua, N. H.
OPEN COIL HEATER & PURIFIER CO., Indianapolis, Ind...*p. 149*
Peerless Engineering Co., 1253 First Nat'l Bank Bldg., Chicago, Ill.
Plant Engineering & Equipment Co. (Inc.), 192 Broadway, New York, N. Y.
*SARCO CO., Inc., 9 Barclay St., New York, N. Y...*pp. 224, 225*
Templeton Mfg. Co., Hyde Park, Mass.

TREADS, SAFETY

American Abrasive Metals Co. ("Feralun"), 50 Church St., New York, N. Y.
IRVING IRON WORKS CO. ("Safstep"), 3rd St. & Dutchhill Creek, Long Island City, N. Y...*p. 662*

TRENCH DIGGING MACHINERY

Austin Machinery Corp'n ("Austin"), Railway Exchange Bldg., Chicago, Ill.
*LIDGERWOOD MFG. CO., 96 Liberty St., New York, N. Y...*p. 388*
Parsons Co., Newton, Iowa
Potter Mfg. Co., 3511 E. Washington St., Indianapolis, Ind.

TRIMMING MACHINES (Tin Plate)

*BLISS, E. W., CO., Brooklyn, N. Y...*pp. 438, 439*
TORRINGTON MFG. CO., Torrington, Conn. *p. 641*

TROLLEYS (Monorail)

Armington Engineering Co., Euclid, Ohio
*BROWN, HOISTING MACHINERY CO., Cleveland, Ohio..*p. 390*
Chisholm & Moore Mfg. Co., 5046 Lakeside Ave., N. E., Cleveland, Ohio
FORD CHAIN BLOCK CO., Second & Diamond St., Philadelphia, Pa...*p. 404*
MARIS BROS. (Inc.), 5546 Grays Ave., Philadelphia, Pa...*p. 395*
MORRIS, HERBERT (Inc.), 1-15 Lawrence Place, Buffalo, N. Y...*p. 402*
NEW JERSEY FOUNDRY & MACHINE CO., 90 West St., New York N. Y...*p. 396*
*PAWLING & HARNISCHFEGER CO. ("P. & H."), Milwaukee, Wis...*p. 398*
Philadelphia Tramrail Co., Front & Indiana Ave., Philadelphia, Pa.
*READING CHAIN & BLOCK CORP'N ("Reading"), Reading Pa...*p. 403*
Speidel, J. G., Reading, Pa.
Young, R. W. Mfg. Co., 81 E. Jackson Blvd., Chicago, Ill.

TRUCKING PLATES (Safety)

Viche Safety Toe Board Co., 415 Lake Ave., South, Duluth, Minn.

Digitized by Google

TRUCKS

—Dump Body (Electric)
BAKER, R. & L. CO., Cleveland, Ohio...*p. 382*
*YALE & TOWNE MFG. CO., Stamford, Conn...*p. 405*

—Elevating
BAKER, R. & L. CO., Cleveland, Ohio...*p. 382*
Clark, Geo. P. Co., Windsor Locks, Conn.
Cowan Truck Co., Holyoke, Mass.
Elwell-Parker Elect. Co., 423 St. Clair, Cleveland, Ohio
Holyoke Truck Co., 102 Race St., Holyoke, Mass.
Lewis-Shepard Co., 568 E. First St., Boston, Mass.
MORRIS, HERBERT (Inc.), 1-15 Lawrence Place, Buffalo, N. Y...*p. 402*
National Scale Co., Chicopee Falls, Mass.
Plimpton Truck Co., Stamford, Conn.
Stuebing Truck Co., 141 E. 4th St., Cincinnati, Ohio
Sturdi-Truck Co., Williamsett, Holyoke, Mass.
Terminal Engineering Co. (Inc.), 17 West 44th St., New York, N. Y.
Transmission Ball Bearing Co. (Inc.), 1050 Military Road, Buffalo, N. Y.

—Factory
Barrett-Cravens Co., 169 N. Ann St., Chicago, Ill.
Chase Foundry & Mfg. Co., Columbus, Ohio
Clark, Geo. P. Co., Windsor Locks, Conn.
Cleveland Wire Spring Co., E. 38th & Hamelton Ave., Cleveland, Ohio
Cowan Truck Co., Water St., Holyoke, Mass.
DIAMOND STATE FIBRE CO., Bridgeport, Pa...*p. 420*
FAIRBANKS CO., 416 Broome St., New York N. Y...*pp. 174, 175*
FAIRBANKS, MORSE & CO., 900 S. Wabash Ave., Chicago, Ill...*p. 41*
Hebard, W. F. & Co., 319 N. Michigan Ave., Chicago, Ill.
Holyoke Truck Co., 102 Race St., Holyoke, Mass.
Lewis-Shepard Co., 568 E. First St., Boston, Mass.
The Howe Scale Co. of N. Y., 341 Broadway, New York, N. Y.
McKinney Mfg. Co. ("One-Man"), Pittsburgh, Pa.
Menasha Wood Split Pulley Co. ("Lawson") Menasha, Wis.
Plimpton Truck Co., Stamford, Conn.
Sabin Machine Co., 6536 Carnegie Ave., Cleveland, Ohio
Sturdi-Truck Co., Williamsett, Holyoke, Mass.
Warren & Irrgang Co., Springfield, Mass.

—Industrial
Case, J. I. Plow Works Co., Racine, Wis.
Clark Tructractor Co., Buchanan, Mich.
Cowan Truck Co., Holyoke, Mass.
FAIRBANKS, MORSE & CO., 900 S. Wabash Ave., Chicago, Ill...*p. 41*
International Harvester Co., 606 S. Michigan Ave., Chicago, Ill.
Plimpton Truck Co., Stamford, Conn.
Scottdale Machine & Mfg. Co., Scottdale, Pa.
Specialty Engineering Co., Allegheny & Trenton Ave., Philadelphia, Pa.
Stuebing Truck Co., 312 E. Court St., Cincinnati, Ohio

—Industrial (Storage Battery)
Automatic Transportation Co., Buffalo, N. Y.
BAKER, R. & L. CO., Cleveland, Ohio...*p. 382*
Buda Co., Harvey, Ill.
Cowan Truck Co., Holyoke, Mass.
Crescent Truck Co., 347-349 First Ave., Elizabeth, N. J.
General Vehicle Co. (Inc.), Long Island City, N. Y.
Hebard, W. F. & Co., 319 Michigan Ave., Chicago, Ill.
Koppel Industrial Car & Equipment Co., Koppel, Beaver Co., Pa.
Mercury Mfg. Co., 4118 S. Halstead St., Chicago, Ill.
Terminal Engineering Co. (Inc.), 17 West 44th St., New York, N. Y.
*YALE & TOWNE MFG. CO., Stamford, Conn...*p. 405*

—Kiln
Grand Rapids Vapor Kiln, Grand Rapids, Mich.
National Dry Kiln Co., 1118-1226 East Maryland St., Indianapolis, Ind.

—Lumber Car (Roller Bearing)
OTTUMWA IRON WORKS (Inc.), Ottumwa, Iowa...*p. 385*

—Mine Car (Roller Bearing)
Herzler & Henninger Mach. Works, Belleville, Ill.
Hockensmith Wheel & Mine Car Co., Penn Station, Pa.
OTTUMWA IRON WORKS (Inc.), Ottumwa, Iowa...*p. 385*

—Oven
OVEN EQUIPMENT & MFG. CO., New Haven, Conn...*p. 534*

—Swivel Hoist (Electric)
BAKER, R. & L. CO., Cleveland, Ohio...*p. 382*
Elwell-Parker Electric Co., 4223 St. Clair, Cleveland, Ohio
*YALE & TOWNE MFG. CO., Stamford, Conn...*p. 405*

—Trailer
*HUNT, C. W. CO. (Inc.), West New Brighton, Staten Island, N. Y...*pp. 374, 375*
*YALE & TOWNE MFG. CO., Stamford, Conn...*p. 405*

—Vault
Yawman & Erbe Mfg. Co., Rochester, N. Y.

TUBE BENDING AND COILING MACHINES
American Pipe Bending Machine Co., 46 Pearl St., Boston, Mass.
Cox Automatic Pipe Bending Co., 681-687 Boulevard, Bayonne, N. J.
Federal Bending Machine Co., Opera House Bldg., Bayonne, N. J.

TUBE CLEANERS

—Boiler
Bushnell, John S. & Co., 146 Liberty St., New York, N. Y.
Chesterton, A. W. Co., 64 India St., Boston, Mass.
General Specialty Co., 61-69 Carroll St., Buffalo, N. Y.
Huyette, Paul B. Co. (Inc.), ("Tornado"), 5 So. 18th St., Philadelphia, Pa.
Lagonda Mfg. Co., Springfield, Ohio
Liberty Mfg. Co., Frick Bldg., Pittsburgh, Pa.
Manchester Mfg. Co., North Manchester, Ind.
Pierce, Wm. B. Co., 45 North Division St., Buffalo, N. Y.
Rosedale Fndry. & Mach. Co., Columbus & Preble Aves., North Side, Pittsburgh, Pa.
Roto Co., P. O. Box 1043, Hartford, Conn.
Sherwood Mfg. Co., 1702-1712 Elmwood Ave., Buffalo, N. Y.
Thompson, Richard & Co., 187 Greenwich St., New York, N. Y.

—Condenser
Griffin, C. M. Co., 211 S. Neville St., Oakland Sta., Pittsburgh, Pa.
Roto Co., P. O. Box 1043, Hartford, Conn.

—Economizer
Roto Co., P. O. Box 1043, Hartford, Conn.

Tu

Digitized by Google

TUBE CLEANERS (Continued)
—Locomotive Arch
Roto Co., P. O. Box 1043, Hartford, Conn.
—Turbine
Roto Co., P. O. Box 1043, Hartford, Conn.

TUBE EXTRACTORS, BOILER
Robertson, John F. Co., 1001 Park Bldg., Pittsburgh, Pa.

TUBE MILL MACHINERY
*LANDIS MACHINE CO. (Inc.), Waynesboro, Pa...*pp. 496, 497*
Modern Machine Tool Co., 401 Water St., Jackson, Mich.
TORRINGTON MFG. CO. Torrington, Conn. ..*p. 641*
—Seamless
Standard Engineering Co., Ellwood City, Pa.

TUBE STOPPERS (Boiler)
Brandt, Randolph, 66 Cortlandt St., New York, N. Y.
KEY BOILER EQUIPMENT CO., 27th & McCasland Ave., East St. Louis, Ill...*pp. 100, 101*

TUBE TAPERING MACHINES
Torrington Co., Torrington, Conn.

TUBE WORKS EQUIPMENT
*LANDIS MACHINE CO. (Inc.), Waynesboro, Pa...*pp. 496, 497*
TORRINGTON MFG. CO., Torrington, Conn. ..*p. 641*

TUBES
—Boiler
Alleghany Steel Co., Pittsburgh, Pa.
AMERICAN BRASS CO., Waterbury, Conn... *p. 414*
American Tube & Pipe Bending Co., 880 East 72nd St., Cleveland, Ohio
Globe Seamless Steel Tubes Co., 1043 Peoples Gas Bldg., Chicago, Ill.
Detroit Seamless Steel Tube Co., care Grand River Station, Detroit, Mich.
Midvale Steel & Ordnance Co., Cambria Steel Co., Widener Bldg., Philadelphia, Pa
Monongahela Tube Co., Pittsburgh, Pa.
National Tube Co. ("National"), Frick Bldg., Pittsburgh, Pa.
NEWBURGH STEAM BOILER WORKS (P. Delany & Co.), Newburgh, N. Y... *p. 64*
Parkesburg Iron Co., Parkesburg, Pa.
Pittsburgh Steel Products Co., Union Arcade Bldg., Pittsburgh, Pa.
South Chester Tube Co., Chester, Pa.
Standard Seamless Tube Co., 313 6th Ave. Pittsburgh, Pa.
Stirling, Allan, 878 Drexel Bldg., Philadelphia, Pa.
Tyler Tube and Pipe Co., Washington, Pa.
*WHEELER CONDENSER & ENGRG. CO., Carteret, N. J...*p. 162*
—Boiler (Charcoal Iron)
Parkesburg Iron Co., Parkesburg, Pa.
Reading Iron Co., Reading, Pa.
Tyler Tube & Pipe Co., Washington, Pa.
—Boiler (Seamless Steel)
Detroit Seamless Steel Tube Co., care Grand River Station, Detroit, Mich.
Globe Seamless Steel Tubes Co., 1043 Peoples Gas Bldg., Chicago, Ill.
Hungerford, U. T. Brass & Copper Co., 80 Lafayette St., New York, N. Y.
Pittsburgh Steel Products Co., Pittsburgh, Pa.
—Boiler (Soft Steel)
Tyler Tube & Pipe Co., Washington, Pa.
—Condenser
AMERICAN BRASS CO., Waterbury, Conn. ..*p. 414*
Baltimore Tube Co. (Inc.), Baltimore, Md.
*WHEELER CONDENSER & ENGINEERING CO. ("Crescent Brand"), Carteret, N. J...*p. 162*
—Evaporator
AMERICAN BRASS CO., Waterbury, Conn. ..*p. 414*
*WHEELER CONDENSER & ENGINEERING Co., ("Crescent Brand"), Carteret, N. J. *p. 162*
—Locomotive
AMERICAN BRASS CO., Waterbury, Conn. *p 414*
—Pneumatic Despatch
LAMSON CO., 100 Boyleston St., Boston, Mass. ..*pp. 378, 379*
Standard Carrier Co., 112 E. 41st St., New York, N. Y.
Universal Tube Co., 142-152 W. Ohio St., Chicago, Ill.
—Superheater
Pittsburgh Steel Products Co., Pittsburgh, Pa.

TUBING
—Alloy
AMERICAN BRASS CO., Waterbury, Conn. ..*p. 414*
Ohio Seamless Tube Co., Shelby, Ohio
SANDUSKY FOUNDRY & MACHINE CO., Sandusky, Ohio...*p. 646*
*WHEELER CONDENSER & ENGINEERING CO. ("Crescent Brand"), Carteret, N. J. *p. 162*
—Aluminum
Ivin's, Ellwood Tube Works, Oak Lane Station, Philadelphia, Pa.
Rome Hollow Wire & Tube Co., Rome, N. Y.
—Automobile
Detroit Seamless Steel Tube Co., Grand River Station, Detroit, Mich.
—Bakelite
*CONTINENTAL FIBRE CO. ("Bakelite-Dilecto"), Newark, Del...*p. 418*
*WESTINGHOUSE ELECTRIC & MFG. CO., East Pittsburgh, Pa...*pp. 160, 161*
—Bent and Swaged
American Tube Bending Co., Inc., 5-7-9 Lawrence St., New Haven, Conn.
—Brass and Copper
AMERICAN BRASS CO., Waterbury, Conn... *p. 414*
*RICHARDSON-PHENIX CO., 126 Reservoir Ave., Milwaukee, Wis...*pp. 248, 249*
—Brass and Copper (Seamless)
AMERICAN BRASS CO., Waterbury, Conn. ..*p. 414*
Baltimore Tube Co. (Inc.), Baltimore, Md.
Bridgeport Brass Co., Bridgeport, Conn.
Chase Rolling Mill Co., Waterbury, Conn.
Erie-Buffalo Tube Co., 1227 W. 18th St., Erie, Pa.
Hungerford, U. T. Brass & Copper Co., 80 Lafayette St., New York, N. Y.
MacKenzie-Walton Co., Pawtucket, R. I.
MUELLER METALS CO., Port Huron, Mich. ..*p. 428*
Rome Hollow Wire & Tube Co., Rome, N. Y.
Rutter, Arthur T. & Co., 256 Broadway, New York, N. Y.
SANDUSKY FOUNDRY & MACHINE CO., Sandusky, Ohio...*p. 646*
*WHEELER CONDENSER & ENGINEERING CO., ("Crescent Brand"), Carteret, N. J...*p. 162*
—Brass, Iron Lined
Phenix Tube Co., Box 419, Warren, Ohio

Digitized by Google

—Carburetor, Flexible Metal
AMERICAN METAL HOSE CO., Waterbury, Conn...*p. 262*

—Exhaust, Flexible Metal
AMERICAN METAL HOSE CO., Waterbury, Conn...*p. 262*

—Fibre
AMERICAN VULCANIZED FIBRE CO., Wilmington, Del...*p. 417*
*CONTINENTAL FIBRE CO., Newark, Del...*p. 418*
DELAWARE HARD FIBRE CO. (Ltd.). (D. H. Egyptian''), Wilmington, Del...*p. 419*
DIAMOND STATE FIBRE CO. (''Condensite Celoron''), Bridgeport, Pa...*p. 420*

—Lock-Joint (Steel)
Mohegan Tube Co. (''Mohegan''), Scott Ave. & Meserole Sts., Brooklyn, N. Y.

—Metal, Flexible
AMERICAN METAL HOSE CO., Waterbury, Conn...*p. 262*
Penna. Flexible Metallic Tubing Co., N. E. Cor. Broad & Race Sts., Philadelphia, Pa.
U. S. Flexible Metallic Tubing Co., 430 Boyd St., Los Angeles, Cal.
WHITE, S. S. DENTAL MFG. CO., 84 Market St., New York, N. Y. *p. 359*

—Oil Well
Reading Iron Co., Reading, Pa.

—Rubber
GOODRICH, B. F. RUBBER CO., Akron, Ohio...*pp. 258, 259*

—Rubber (Hard)
GOODRICH, B. F. RUBBER CO., Akron, Ohio...*pp. 258, 259*
Stokes, Jos. Rubber Co., Trenton, N. J.

—Steel
Mohegan Tube Co., (''Mohegan''), Scott Ave., & Meserole Sts., Brooklyn, N. Y.
Phenix Tube Co., Box 419, Warner, Ohio
*RICHARDSON-PHENIX CO., 126 Reservoir Ave., Milwaukee, Wis...*pp. 248, 249*
Rome Manufacturing Co., Rome, N. Y.
Standard Parts Co., E. 11th & Walnut Sts., Cleveland, Ohio

—Steel (Seamless)
Blum, Julius & Co., 532-40 W. 22nd St., New York, N. Y.
Detroit Seamless Steel Tube Co., care Grand River Station, Detroit, Mich.
Globe Seamless Steel Tubes Co., 1043 Peoples Gas Bldg., Chicago, Ill.
Hungerford, U. T. Brass & Copper Co., 80 Lafayette St., New York, N. Y.
Ivins' Tube Works, Ellwood, Oak Lane Station, Philadelphia, Pa.
National Tube Co. (''Shelby''), Frick Bldg., Pittsburgh, Pa
Ohio Seamless Tube Co., Shelby, Ohio
Standard Seamless Tube Co., 313 6th Ave., Pittsburgh, Pa.

TUMBLING BARRELS
Abbott Ball Co., Hartford, Conn.
Baird Machine Co., Bridgeport, Conn.
DAYTON-DOWD CO. (''Reliable''), Quincy, Ill...p. *566*
*FALLS CLUTCH & MACHINERY CO., Cuyahoga Falls, Ohio...*p. 330*
Illinois Mfg. & Supply Co., Quincy, Ill.
Sly, W. W., Mfg. Co., Cleveland, Ohio

—Burnishing
Globe Machine & Stamping Co. (''Globe''), 1254 W. 76th St., Cleveland, Ohio

—Sand Blast
New Haven Sand Blast Co., New Haven, Conn.
*PANGBORN CORPN., P. O. Box 859, Hagerstown, Md...*pp. 636, 637*
Tilghman-Brooksbank Sand Blast Co., 1126 S. Eleventh St., Philadelphia, Pa.

TURBINE BLADING
AMERICAN BRASS CO., Waterway, Conn...*p. 414*

TURBO-BLOWERS
Carling Turbine Blower Co. (Inc.), Worcester, Mass.
COPPUS ENGINEERING & EQUIPMENT CO., 342-348 Park Ave., Worcester, Mass...*pp. 104, 105*
*DE LAVAL STEAM TURBINE CO., Trenton, N. J...*p. 22*
*GENERAL ELECTRIC CO., Schenectady, N. Y. *pp. 18, 19, 20, 21*
*INGERSOLL-RAND CO., 11 Broadway, New York, N. Y...*pp. 546, 547*
*MOORE STEAM TURBINE CORPN., Wellsville, N. Y...*pp. 24, 25*
Power Turbo-Blower Co., 347 Madison Ave., New York, N. Y.
SPENCER TURBINE CO., Hartford, Conn...*p. 552*
*TERRY STEAM TURBINE CO., Hartford, Conn...*pp. 26, 27*
*WESTINGHOUSE ELECTRIC & MFG., East Pittsburgh, Pa...*pp. 160, 161*
WING, L. J. MFG. CO., 352 W 13th St., New York, N. Y...*pp. 107, 625*

TURBO-COMPRESSORS
*DE LAVAL STEAM TURBINE CO., Trenton, N. J...*p. 22*
*GENERAL ELECTRIC CO., Schenectady, N. Y...*pp. 18, 19, 20, 21*
SPENCER TURBINE CO., Hartford, Conn...*p. 552*

TURBO-GENERATORS
*ALLIS-CHALMERS MFG. CO., Milwaukee, Wis...*pp. 28, 29*
*DE LAVAL STEAM TURBINE CO., Trenton, N. J...*p. 22*
*INGERSOLL-RAND CO., 11 Broadway, New York, N. Y...*pp. 546, 547*
*KERR TURBINE CO., Wellsville, N. Y...*p. 23*
*MOORE STEAM TURBINE CORPN., Wellsville, N. Y...*pp. 24, 25*
Pyle National Co., 1334 N. Kostner Ave., Chicago, Ill.
Ridgeway Dynamo & Engine Co., Ridgway, Pa.
STURTEVANT, B. F. CO., Hyde Park, Boston, Mass...*p. 106*
*TERRY STEAM TURBINE CO., Hartford, Conn...*pp. 26, 27*
*WESTINGHOUSE ELECTRIC & MFG. CO., East Pittsburgh, Pa...*pp. 160, 161*

TURBO-GENERATORS (Headlight Sets)
*GENERAL ELECTRIC CO., Schenectady, N. Y...*pp. 18, 19, 20, 21*

TURBO-PUMPS
*ALLIS-CHALMERS MFG. CO., Milwaukee, Wis...*pp. 28, 29*
COPPUS ENGINEERING & EQUIPMENT CO., 342-348 Park Ave., Worcester, Mass...*pp. 104, 105*
*DE LAVAL STEAM TURBINE CO., Trenton, N. J...*p. 22*
Economy Pumping Machinery Co., 104-118 No. Curtis St., Chicago, Ill...*p. 568*
*KERR TURBINE CO., Wellsville, N. Y...*p. 23*
*MOORE STEAM TURBINE CORPN., Wellsville, N. Y...*pp. 24, 25*
*TERRY STEAM TURBINE CO., Hartford, Conn...*pp. 26, 27*
*WESTINGHOUSE ELECTRIC & MFG. CO., East Pittsburgh, Pa...*pp. 160, 161*
*WHEELER CONDENSER & ENGINEERING CO., Carteret, N. J...*p. 162*

Tu

Digitized by Google

TURBINES

—Hydraulic

*ALLIS-CHALMERS MFG. CO., Milwaukee, Wis...*pp. 28, 29*
Christiana Machine Co., Christiana, Pa.
*CRAMP, WM. & SONS SHIP & ENGINE BLDG. CO., Richmond & Norris Sts., Philadelphia, Pa...*pp. 30, 31*
Davis Foundry & Machine Works, Rome, Ga.
Dominion Engineering Works, Ltd., P. O. Box 2799, Montreal, Quebec, Canada
Hendy, Joshua Iron Works, 75 Fremont St., San Francisco, Cal.
Holyoke Machine Co., Holyoke, Mass.
Hunt, Rodney Machine Co., Orange, Mass.
*JOLLY, J. & W. (Inc.), Holyoke, Mass...*p. 32*
*LEFFEL, JAMES & CO., Springfield, Ohio...*p. 33*
Munson Mill Machinery Co., (Inc.), 405 Broadway, Utica, N. Y.
Northern Machine Corpn., Camden, N. J.
PELTON WATER WHEEL CO., 1982 Harrison St., San Francisco, Cal...*pp. 34, 35*
POOLE ENGINEERING & MACHINE CO., Woodberry, Baltimore, Md...*pp. 316, 317*
Smith, S. Morgan Co., York, Pa.
Trump Mfg. Co., Springfield, Ohio
United Iron Works, Oakland, Cal.
*WORTHINGTON PUMP & MACHINERY CORPN., 115 Broadway, New York, N. Y...*pp. 44, 45, 46, 47*

—Steam

*ALLIS-CHALMERS MFG. CO., Milwaukee, Wis...*pp. 28, 29*
COPPUS ENGINEERING & EQUIPMENT CO., 342-348 Park Ave., Worcester, Mass...*pp. 104, 105*
*DE LAVAL STEAM TURBINE CO., Trenton, N. J...*p. 22*
*GENERAL ELECTRIC CO. (''Curtis''). Schenectady, N. Y...*pp. 18, 19, 20, 21*
Hallidie Co. (''Hallidie-Parsons''), N. 702 Division St., Spokane, Wash.
*KERR TURBINE CO. (''Economy''), Wellsville, N. Y...*p. 23*
Midwest Engine Co., Indianapolis, Ind.
*MOORE STEAM TURBINE CORPN., Wellsville, N. Y...*pp 24, 25*
Platt, John & Co., 2 Rector St., New York, N. Y.
Power Turbo Blower Co., 347 Madison Ave. New York, N. Y.
Ridgway Dynamo & Engine Co., Ridgway, Pa.
Steam Motors Co. (Inc.), Springfield, Mass.
STURTEVANT, B. F. CO., Hyde Park, Boston, Mass...*p. 106*
*TERRY STEAM TURBINE CO., Hartford, Conn...*pp. 26, 27*
Turbine Equipment Co., 50 Church St., New York, N. Y.
*WESTINGHOUSE ELECTRIC & MFG. CO. East Pittsburgh, Pa...*pp. 160 161*
WING, L. J. MFG. CO., 352 W. 13th St., New York, N. Y...*pp. 107, 625*

TURNBUCKLE MACHINERY

Langelier Mfg Co., 51 Washington Ave., Arlington, Cranston, R. I.

TURNBUCKLES

E. C. Manufacturing Co., 546-548 W. Harrison St., Chicago, Ill.
Merrill Bros., Mespeth, N. Y.
Michigan Bolt & Nut Works, Detroit, Mich.
NEWHALL CHAIN FORGE & IRON CO., 90 West St., New York, N. Y...*p. 410*
Standard Turnbuckle Co., Woolworth Bldg., New York, N. Y.

TURNING AND STRAIGHTENING MACHINES

*MEDART PATENT PULLEY CO., St. Louis, Mo...*p. 333*

TURNTABLES

American Bridge Co., 30 Church St., New York, N. Y.
Canton Foundry & Machine Co., Canton, Ohio
Easton Car & Construction Co., 679-50 Church St., New York, N. Y.
STEACY-SCHMIDT MFG. CO., York, Pa...*p. 612*

—Industrial Railway

Koppel Industrial Car & Equipment Co., Koppel, Beaver Co., Pa.

—Overhead Track

MARIS BROS. (Inc.), 5546 Grays Ave., Philadelphia, Pa...*p. 395*

TURRET HEADS

Turner Machine Co., 28-40 Maple Ave., Danbury, Conn.

TURRET MACHINES

(See Lathes, Turret)

TWIST DRILLS

(See Drills, Twist)

U

UNDERFEED STOKERS

(See Stokers, Underfeed)

UNIONS

Athol Pump Co., Athol, Mass.
Bard Union Co., (Inc.), Norwich, Conn.
Berry Flexible Pipe Joint Co., 845 Barrow St., New Orleans, La.
BUCKEYE IRON & BRASS WORKS, Dayton, Ohio...*p. 168*
ILLINOIS MALLEABLE IRON CO. (''Nokoros''), (''Inco''), (''C. D. Railroad''). 1801-25 Diversey Parkway, Chicago, Ill...*p. 241*
JARECKI MFG. CO., Erie, Pa...*pp. 178, 179*
Jefferson Union Co., Lexington, Mass.
KELLY & JONES CO. (''Nip'', ''Norustocta''), Greensburg, Pa...*pp. 182, 183*
*LUNKENHEIMER CO., Cincinnati, Ohio...*pp. 184, 185, 186, 187, 188. 189*
McMann & Taylor Co. (''Mantaco''), 104-106 John St., New York, N. Y.
Rhode Island Fittings Co., Hillsgrove, R. I.
Standard Union Co., 7 Water St., Boston, Mass.
Williams, Franklin (Inc.), (''Tuxedo''). 39 Cortlandt St., New York, N. Y.

—Flange

*CRANE CO., 836 S. Michigan Ave., Chicago, Ill...*pp. 170, 171, 172, 173*
Dart, E. M. Mfg. Co., 134 Thurbers Ave., Providence, R. I.
HYDRAULIC PRESS MFG. CO. (The), Mt. Gilead, Ohio...*p. 593*
KELLY & JONES CO., Greensburg, Pa...*pp. 182, 183*
*PITTSBURG VALVE, FOUNDRY & CONSTRUCTION CO., P. O. Box 1016, Pittsburgh, Pa...*pp. 192, 193*
WATSON-STILLMAN CO., 35 Church St., New York, N. Y...*p. 596*
WILLIAMS, J. H. & CO., 70 Richards St., Brooklyn, N. Y...*p. 517*

—Pressed Steel

Mark Mfg. Co., 2111 Conway Bldg., Chicago, Ill.
Rockwood Sprinkler Co. of Mass., 34-35 Harlow St., Worcester, Mass.

—Tuyere (Blast Furnace)

Pittsburgh Brass Mfg. Co., 3155 Penn. Ave., Pittsburgh, Pa.

UNLOADERS

—Air Conveyor

*INGERSOLL-RAND CO., 11 Broadway, New York, N. Y...*pp. 546, 547*
JARECKI MFG. CO., Erie, Pa...*pp. 178, 179*

Digitized by Google

JEFFREY MFG. CO., 904 N. 4th St., Columbus, Ohio...*pp. 376, 377*
WESTINGHOUSE TRACTION BRAKE CO., Wilmerding, Pa...*pp. 550, 551*
*WORTHINGTON PUMP & MACHINERY CORPN., 115 Broadway, New York, N. Y. ...*pp. 44, 45, 46, 47*
*YARNALL-WARING CO. ("Yarway"), 7603-20 Queen St., Chestnut Hill, Philadelphia, Pa...*p. 196*

—Car
Galion Iron Works & Mfg. Co., Galion, Ohio
WELLER MFG. CO., 1820-56 N. Kostner Ave., Chicago, Ill...*p. 381*

—Car (Crushed Stone)
Galion Iron Works & Mfg. Co., Galion, Ohio

—Portable
FULTON IRON WORKS CO., St. Louis, Mo. ...*p. 37*
JEFFREY MFG. CO., 904 N. 4th St., Chicago, Ill...*pp. 376, 377*
Portable Machinery Co., Passaic, N. J.
WELLER MFG. CO., 1820-1856 N. Kostner Ave., Chicago, Ill...*p. 381*

—Portable (Vessel)
Rownson, Drew & Clydesdale (Inc.), 80 Wall St., New York, N. Y.

UPSETTING MACHINES
Ajax Mfg. Co., 3830 Lakeside Ave., Cleveland, Ohio
Champion Machine and Forging Co., 3695 East 78th St., Cleveland, Ohio
NILES-BEMENT-POND CO., 111 Broadway, New York, N. Y...*p. 470*

—Tire (With Punch and Shears)
Luther Mfg. Co. (Inc.), 133 Railroad Ave., Olean, N. Y.

V

VACUUM BREAKERS
Consolidated Engine Stop Co., 133 W. 19th St., New York, N. Y.
Morton Vacuum Breaker Co., 1334 Washington St., Canton, Mass.

VACUUM CLEANING MACHINERY
American Radiator Co., 816-822 S. Michigan Ave., Chicago, Ill.
Monarch Vacuum Specialties Corpn., 1161-1175 Broadway, New York, N. Y.
SPENCER TURBINE CO., Hartford, Conn... *p. 552*

VACUUM DRYERS, HEATING SYSTEMS PANS, PUMPS, TRAPS, ETC.
(See Dryers, Heating Systems, Pans, Pumps Traps, etc., Vacuum)

VACUUM DRYING APPARATUS
Buffalo Foundry & Machine Co., 41 Winchester Ave., Buffalo, N. Y.
DEVINE, J. P. CO., 1375 Clinton St., Buffalo, N. Y...*pp. 606, 607*
Hubbard's, Norman Sons Machine Works, 265 Water St., Brooklyn, N. Y.
SWENSON EVAPORATOR CO., 945 Monadnock Bldg., Chicago, Ill...*p. 611*

VACUUM HEADS (For Ingot Molds)
Peyton & Hitt, 426 W. 3rd St., Elyria, Ohio

VALVE BALLS
AUBURN BALL BEARING CO., 22 Elizabeth St., Rochester, N. Y...*p. 340*

VALVE BOXES
WOOD, R. D. & CO., Philadelphia, Pa...*p. 597*

VALVE CUPS
Schenck Mfg. & Supply Co., Parkers Landing, Pa.

VALVE INSERTING MACHINES (Water)
Smith, A. P. Mfg. Co., East Orange, N. J.

VALVE RESEATING MACHINES
AMERICAN TOOL & MACHINE CO., Boston 9, Mass...*p. 614*
LEAVITT MACHINE CO., Orange, Mass... *pp. 198, 199*

VALVE STEMS (Gas Engine)
Steel Products Co., Cleveland, Ohio
WILLIAMS, J. H. & CO., 70 Richards St., Brooklyn, N. Y...*p. 517*

VALVES

—Acid
Cadman, A. W. Mfg. Co., 2814 Smallman St., Pittsburgh, Pa.
Chemical Pump & Valve Co., 327 Gifford St., Perth Amboy, N. J.
Cleveland Brass Mfg. Co., 4606 Hamilton Ave., Cleveland, Ohio
*CRANE CO., 836 S. Michigan Ave., Chicago, Ill...*pp. 170, 171, 172, 173*
ECKENROTH VALVE & MFG. CO., 156-158 Conarroe Street, Manayunk, Philadelphia, Pa...*p. 169*
Everlasting Valve Co., 49 Fisk St., Jersey City, N. J.
FAIRBANKS CO., 416 Broome St., New York, N. Y. *pp. 174, 175*
*HOMESTEAD VALVE MFG. CO., P. O. Box 1754, Pittsburgh, Pa...*p. 177*
*JENKINS BROS., 80 White St., New York, N. Y...*pp. 180, 181*
KELLY & JONES CO., Greensburg, Pa... *pp. 182, 183*
Lippold Valve Co., Erie, Pa.
Monarch Mfg. Works, Salmon & Westmoreland Sts., Philadelphia, Pa.
Murray Pump & Valve Mfg. Co., New Lexington, Ohio
Nassau Value & Pump Co. (Inc.), Rockville Center, L. I., N. Y.
*NELSON VALVE CO., Chestnut Hill, Philadelphia, Pa...*p. 190*
*SCHUTTE & KOERTING CO., 1184 Thompson St., Philadelphia, Pa...*p. 159*
YORK MFG. CO., York, Pa...*p. 631*

—Air (Automatic)
Brunner Mfg. Co., Utica, N. Y.
CASH, A. W. CO., Decatur, Ill...*p. 205*
*CRANE CO., 836 S. Michigan Ave., Chicago, Ill...*pp. 170, 171, 172, 173*
*CROSBY STEAM GAGE & VALVE CO., 40 Central St., Boston, Mass...*pp. 202, 208*
FISHER GOVERNOR CO., Marshalltown, Iowa...*p. 208*
FOSTER ENGINEERING CO., Newark, N. J. ...*p. 209*
FULTON CO. ("Sylphon"), Knoxville, Tenn...*pp. 218, 219*
Hoffman Specialty Co., Waterbury, Conn.
*JENKINS BROS., 80 White St., New York, N. Y...*pp. 180, 181*
Magee Valve Co. (Inc.), 136 Beekman St., New York, N. Y.
Marsh, James P. & Co., 118 S. Clinton St., Chicago, Ill.
National Steam Specialty Co., 12 S. Clinton St., Chicago, Ill.
*POWERS REGULATOR CO., 995 Architects Bldg., New York, N. Y...*pp. 222, 223*
SIMPLEX VALVE & METER CO., Philadelphia, Pa...*p. 278*
*SMITH, H. B. CO., Westfield, Mass...*pp. 626, 627*

—Air Compressor
HOPE ENGINEERING & SUPPLY CO., Mt. Vernon, Ohio...*p. 49*

—Air Operating
CASH, A. W. CO., Decatur, Ill...*p. 205*
FOSTER ENGINEERING CO., Newark, N. J. ...*p. 209*

Va

Digitized by Google

VALVES (Continued)

*HOMESTEAD VALVE MFG. CO., P. O. Box 1754, Pittsburgh, Pa...*p. 177*
*JENKINS BROS., 80 White St., New York, N. Y...*pp. 180, 181*
*PITTSBURGH VALVE, FOUNDRY & CONSTRUCTION CO. (Tanner), P. O. Box 1016 Pittsburgh, Pa...*pp. 192, 193*

—Air Relief

AMERICAN STEAM GAUGE & VALVE MFG. CO., Boston, Mass...*pp. 200, 201*
*ASHTON VALVE CO., 161 First St., Cambridge, Boston, Mass...*p. 287*
BUCKEYE IRON & BRASS WORKS Dayton, Ohio...*p. 168*
CASH, A. W. CO., Decatur, Ill...*p. 205*
*CRANE CO., 836 S. Michigan Ave., Chicago, Ill...*pp. 170, 171, 172, 173*
*CROSBY STEAM GAGE & VALVE CO., 40 Central St., Boston, Mass...*pp. 202, 208*
DUNHAM, C. A. CO., 230 East Ohio Street, Chicago, Ill...*p. 227*
FULTON CO. (''Sylphon''), Knoxville, Tenn. ..*pp. 218, 219*
Golden-Anderson Specialty Co., 1228 Fulton Bldg., Pittsburgh, Pa.
*ILINOIS ENGINEERING CO. ('Eclipse'), Chicago, Ill...*pp. 210, 211*
*JENKINS BROS., 80 White St., New York, N. Y...*pp. 180, 181*
LONERGAN, J. E. CO., 211-215 Race St., Philadelphia, Pa...*pp. 203, 289*
*LUNKENHEIMER CO., Cincinnati, Ohio... *pp. 184, 185, 186, 187, 188, 189*
SCOTT VALVE MFG. CO. (''Scott''), Detroit, Mich...*p. 191*
*WHEELER CONDENSER & ENGRG. CO., Carteret, N. J...*p. 162*

—Altitude

CASH, A. W. CO., Decatur, Ill...*p. 205*
Chaplin-Fulton Mfg. Co. (''Fulton''), 28-36 Penn Ave., Pittsburgh, Pa.
FOSTER ENGINEERING CO., Newark, N. J. *p. 209*
*KIELEY & MUELLER (Inc.), (''Kieley''), 34 W. 13th St., New York, N. Y...*p. 212*
SIMPLEX VALVE & METER CO., Philadelphia, Pa...*p. 278*

—Ammonia

American Carbonic Machinery Co., Wisconsin Rapids, Wis
AMERICAN STEAM GAUGE & VALVE MFG. CO., Boston, Mass...*pp. 200, 201*
CASH, A. W. CO., Decatur, Ill...*p. 205*
*CRANE CO., 836 S. Michigan Ave., Chicago, Ill...*pp. 170, 171, 172, 173*
*CROSBY STEAM GAGE & VALVE CO., 40 Central St., Boston, Mass...*pp. 202, 208*
*DE LA VERGNE MACHINE CO., 1123 E. 138th St., New York, N. Y...*p. 40*
ECKENROTH VALVE & MFG. CO., 156-158 Conarroe Street, Manayunk, Philadelphia, Pa...*p. 169*
FOSTER ENGINEERING CO., Newark, N. J. *p. 209*
*JENKINS BROS., 80 White St., New York, N. Y...*pp. 180, 181*
KELLY & JONES CO., Greensburg, Pa...*pp. 182, 183*
LONGERGAN, J. E. CO., 211-215 Race St., Philadelphia, Pa...*pp. 203, 289*
*LUNKENHEIMER CO., Cincinnati, Ohio... *pp. 184, 185, 186, 187, 188, 189*
*READING VALVE FITTINGS CO. (Pratt & Cady Div.), Hartford, Conn...*pp. 194, 195*
Refrigerating Specialties Co., 9 S. Clinton St., Chicago, Ill.
*VILTER MFG. CO., 1194-1196 Clinton St., Milwaukee, Wis...*pp. 16, 17*
*VOGT, HENRY MACHINE CO., Louisville, Ky...*pp. 632, 633*
YORK MFG. CO., York, Pa...*p. 631*

—Back Pressure

Boyleston Steam Specialty Co., 116 W. Illinois St., Chicago, Ill.
CASH, A. W. CO., Decatur, Ill...*p. 205*
Connelly Iron Sponge & Governor Co., 227 Fulton St., New York, N. Y.
*CRANE CO., 836 S. Michigan Ave., Chicago, Ill...*pp. 170, 171, 172, 173*
*CROSBY STEAM GAGE & VALVE CO., 40 Central St., Boston, Mass...*pp. 202, 208*
FISHER GOVERNOR CO. (''Fisher''), Marshalltown, Iowa...*p. 219*
FOSTER ENGINEERING CO., Newark, N. J. *p. 209*
*H. S. B. W. COCHRANE CORPN., (''Cochrane'', ''Multiport''), Philadelphia, Pa... *pp. 146, 147*
*ILLINOIS ENGINEERING CO. ('Eclipse'), Chicago, Ill...*pp. 210, 211*
*JENKINS BROS., 80 White St., New York, N. Y...*pp. 180, 181*
KELLY & JONES CO., Greensburg, Pa...*pp. 182, 183*
*KIELEY & MUELLER (Inc.), (''Kieley''), 34 W. 13th St., New York, N. Y...*p. 212*
Klipfel Mfg. Co., 2651 W. Harris St., Chicago, Ill.
Konod, M. J. Co., 602 Bessemer Bldg., Pittsburgh, Pa.
*NELSON VALVE CO., Chestnut Hill, Philadelphia, Pa...*p. 190*
OPEN COIL HEATER & PURIFIER CO., Indianapolis, Ind...*p. 149*
*PITTSBURGH VALVE, FOUNDRY & CONSTRUCTION CO., P. O. Box, 1016, Pittsburgh, Pa...*pp. 192, 193*
*READING VALVE FITTINGS CO. (Pratt & Cady Div.), Hartford, Conn...*pp. 194, 195*
*SCHUTTE & KOERTING CO., 1184 Thompson St., Philadelphia, Pa...*p. 159*
*WHEELER, C. H. MFG. CO., Sedgley & Lehigh Ave., Philadelphia, Pa...*p. 163*

—Balanced

Atlas Valve Co., 282- 286 South St., Newark, N. J.
Baker Valve Co., Box 1772, Minneapolis, Minn.
CASH, A. W., CO., Decatur, Ill...*p. 205*
*CRANE CO., 836 S. Michigan Ave., Chicago, Ill...*pp. 170, 171, 172, 173*
FISHER GOVERNOR CO., Marshalltown,, Iowa..*p. 208*
FOSTER ENGINEERING CO., Newark, N. J. *p. 209*
*HOMESTEAD VALVE MFG. CO., P. O. Box 1754, Pittsburgh, Pa...*p. 177*
*KIELEY & MUELLER, (Inc.), (''Kieley''), 34 W. 13th St., New York, N. Y...*p. 212*
Klipfel Mfg. Co., 2651 W. Harris St., Chicago, Ill.
Konold, M. J. Co., 602 Bessemer Bldg., Pittsburgh, Pa.
Lewis Steam Specialty & Valve Co., 1533 Cherry St., Philadelphia, Pa.
Locke Regulator Co., 76 North St., Salem, Mass.
*LUNKENHEIMER CO., Cincinnati, Ohio *pp. 184, 185, 186, 187, 188, 189*
MASON REGULATOR CO., Boston, Mass. *pp 214, 215*
NASON MFG. CO., 71 Fulton St., New York, N. Y...*p. 216*
*PITTSBURGH VALVE, FOUNDRY & CONSTRUCTION CO., P. O. Box 1016, Pittsburgh, Pa...*pp. 192, 193*
SCOTT VALVE MFG. CO. (''Flower'') Detroit, Mich...*p. 191*
WOOD, R. D. & CO., Philadelphia, Pa...*p. 597*
Young, C. C., Jersey Shore, Pa.

Digitized by Google

—Ball
American Ball Valve & Mfg. Co., 572 Franklin St., Detroit, Mich.
AMERICAN STEAM GAUGE & VALVE MFG. CO., Boston, Mass...*pp. 200, 201*
*CRANE CO., 836 S. Michigan Ave., Chicago, Ill...*pp. 170, 171, 172, 173*
FAIRBANKS CO., 416 Broome St., New York, N. Y...*pp. 174, 175*

—Blowoff
Bashlin Co., Warren, Pa.
Bordo, L. J. Co., 12th and Thompson Sts., Philadelphia, Pa.
BUCKEYE IRON & BRASS WORKS, Dayton, Ohio...*p. 168*
Cadman, A. W. Mfg. Co., 2814 Smallman St., Pittsburgh, Pa.
Carthage Machine Co ("Digester"), Carthage, N. Y.
Coale Muffler & Safety Valve Co. ("Riggin"), 325 E. Oliver St., Baltimore, Md.
*CRANE CO., 836 S. Michigan Ave., Chicago, Ill...*pp. 170, 171, 172, 173*
*CROSBY STEAM GAGE & VALVE CO., 40 Central St., Boston, Mass...*pp. 202, 208*
ECKENROTH VALVE & MFG. CO., 156-158 Conarroe Street, Manayunk, Philadelphia, Pa...*p. 169*
Edward Valve & Mfg. Co., East Chicago, Ind.
Everlasting Valve Co., 49 Fisk St., Jersey City, N. J.
FAIRBANKS CO., 416 Broome St., New York, N. Y...*pp. 174, 175*
*HOMESTEAD VALVE MFG. CO. ("Hovalco"), P. O. Box 1754, Pittsburgh, Pa...*p. 177*
*ILLINOIS ENGINEERING CO. (Eclipse), Chicago, Ill...*pp. 210, 211*
*JENKINS BROS., 80 White St., New York, N. Y...*pp. 180, 181*
KELLY & JONES CO., Greensburg, Pa...*pp. 182, 183*
Liberty Mfg. Co., Frick Bldg., Pittsburgh, Pa.
*LUNKENHEIMER CO. ("Duro." "Renewo"), Cincinnati, Ohio...*pp. 184, 185, 186, 187, 188, 190*
Lytton Manufacturing Corp., Franklin, Va.
National Boiler Specialties Co., Elgin, Ill.
*NELSON VALVE CO., Chestnut Hill, Philadelphia, Pa...*p. 190*
Ohio Injector Co., S. Main St., Wadsworth, Ohio
*PITTSBURGH VALVE, FOUNDRY & CONSTRUCTION CO., P. O. Box 1016, Pittsburgh, Pa...*pp. 192, 193*
*READING VALVE FITTINGS CO., Pratt & Cady Div., Hartford, Conn...*pp. 194, 195*
*RICHARDSON-PHENIX CO., 126 Reservoir Ave., Milwaukee, Wis...*pp. 248, 249*
Sargent Co., W. Jackson Blvd., Des Plaines Ave., Chicago, Ill.
Scully Steel & Iron Co ("Everlasting"), P. O. Box 814, Chicago, Ill.
Steam Appliance Co., 709 63rd Ave., West Allis, Wis.
*YARNALL-WARING CO. ("Yarway"), 7603-20 Queen St., Chestnut Hill, Philadelphia, Pa...*p. 196*

—Butterfly
BUCKEYE IRON & BRASS WORKS, Dayton, Ohio...*p. 168*
CASH, A. W., CO., Decatur, Ill...*p. 205*
Coldwell-Wilcox Co., Newburgh, N. Y.
*CRANE CO. 836 S. Michigan Ave., Chicago, Ill...*pp. 170, 171, 172, 173*
KELLY & JONES CO., Greensburg, Pa...*pp. 182, 183*
*LUNKENHEIMER CO., Cincinnati, Ohio...*pp. 184, 185, 186, 187, 188, 189*
*PITTSBURGH VALVE, FOUNDRY & CONSTRUCTION CO., P. O. Box 1016, Pittsburgh, Pa,...*pp, 192, 193*
*SCHUTTE & KOERTING CO., 1184 Thompson St., Philadelphia, Pa...*p. 159*

—By-Pass
*BRAUN, C. F. & CO., San Francisco, Cal. ...*pp. 156, 157*

—Check
AMERICAN STEAM GAUGE & VALVE MFG. CO., Boston, Mass...*pp. 200, 201*
American Valve Co., Coxsackie, N. Y.
Bashlin Co., Warren, Pa.
Bayer Valve Co., 4067 Park Ave., St. Louis Mo.
BUCKEYE IRON & BRASS WORKS, Dayton, Ohio...*p. 168*
Chapman Valve Mfg. Co., Indian Orchard, Mass.
CLOW, JAMES B. & SONS, 534 So. Franklin St., Chicago, Ill...*pp. 230, 231*
Coffin Valve Co., Neponset, Mass.
*CRANE CO., 836 S. Michigan Ave., Chicago, Ill...*pp. 170, 171, 172, 173*
*CROSBY STEAM GAGE & VALVE CO., 40 Central St., Boston, Mass...*pp. 202, 208*
Eddy Valve Co., Waterford, N. Y.
Edward Valve & Mfg. Co., East Chicago, Ind.
FAIRBANKS CO., 416 Broome Street, New York, N. Y...*pp. 174, 175*
FISHER GOVERNOR CO., Marshalltown, Iowa...*p. 208*
*GREENE, TWEED & CO., 109 Duane St., New York, N. Y...*p. 250*
*ILLINOIS ENGINEERING CO. (Eclipse), Chicago, Ill...*pp. 210, 211*
JARECKI MFG. CO., Erie, Pa...*pp. 178, 179*
*JENKINS BROS., 80 White St., New York, N. Y...*pp. 180, 181*
KELLY & JONES CO., Greensburg, Pa...*pp. 182, 183*
Lippold Valve Co., Erie, Pa.
Ludlow Valve Mfg. Co., Troy, N. Y.
*LUNKENHEIMER CO. ("Ferrenewo." "Renewo"), Cincinnati, Ohio...*pp. 184, 185, 186, 187, 188, 189*
METALWOOD MFG. CO., Detroit, Mich...*p. 594*
Milwaukee Valve Co., 139 Burrell St., Milwaukee, Wis.
NATIONAL SUPPLY CO., Toledo, Ohio...*pp. 648, 649*
*NELSON VALVE CO., Chestnut Hill, Philadelphia, Pa...*p. 129*
*PITTSBURGH VALVE, FOUNDRY & CONST. CO., P. O. Box 1016, Pittsburgh, Pa...*pp. 192, 193*
*READING VALVE FITTINGS CO. (Pratt & Cady Div.), Hartford, Conn...*pp. 194, 195*
*RICHARDSON-PHENIX CO., 126 Reservoir Ave., Milwaukee, Wis...*pp. 248, 249*
*SCHUTTE & KOERTING CO., 1184 Thompson St., Philadelphia, Pa...*p. 159*
SCOTT VALVE MFG. CO. ("Scott." "Rouse"), Detroit, Mich...*p. 191*
WOOD, R. D. & CO., Philadelphia, Pa...*p. 597*

—Check (Drumhead)
Edward Valve & Mfg. Co., East Chicago, Ind.

—Check, Lead Lined
Boyts, Porter & Co., Connellsville, Pa.

—Chronometer
FISHER GOVERNOR CO., Marshalltown, Iowa...*p. 208*
FOSTER ENGINEERING CO., Newark, N. J. ...*p. 209*
UNION WATER METER CO., Worcester, Mass...*p. 276*

—Cold Water
CASH, A. W. CO., Decatur, Ill...*p. 205*
Victor Balata & Textile Belting Co. ("Victor"), 38 Murray St., New York, N. Y.

—Combined Back Pressure & Relief
FISHER GOVERNOR CO., Marshalltown, Iowa...*p. 208*

Va

Digitized by Google

VALVES (Continued)

—Diaphragm
CASH, A. W. CO., Decatur, Ill...*p. 205*
FOSTER ENGINEERING CO., Newark, N. J. ..*p. 209*
JOHNSON SERVICE CO. (''Sylphon''), Milwaukee, Wis...*pp. 220, 221*
UNION WATER METER CO., Worcester, Mass...*p. 276*

—Dry Pipe (Sprinkler)
Globe Automatic Sprinkler Co., 2035 Washington Ave., Philadelphia, Pa.

—Electrically Operated
DEAN, PAYNE (Ltd.), 103 Park Ave., New York, N. Y...*p. 197*
Everlasting Valve Co., 49 Fisk St., Jersey City, N. J.
*GENERAL ELECTRIC CO., Schenectady, N. Y...*pp. 18, 19, 20, 21*
LARNER JOHNSON VALVE & ENGRG. CO., Widener Bldg., Philadelphia, Pa...*p. 589*
Ludlow Valve Mfg. Co., Troy, N. Y.
*NELSON VALVE CO., Chestnut Hill, Philadelphia, Pa...*p. 129*
*PITTSBURGH VALVE, FOUNDRY & CONSTRUCTION CO., P. O. Box 1016, Pittsburgh, Pa...*pp. 192, 193*
*READING VALVE & FITTINGS CO. (Pratt & Cady Div.), Hartford, Conn...*pp. 194, 195*

—Exhaust Relief
CASH, A. W. CO., Decatur, Ill...*p. 205*
*CRANE CO., 836 S. Michigan Ave., Chicago, Ill...*pp. 170, 171, 172, 173*
FISHER GOVERNOR CO. (''Fisher''), Marshalltown, Iowa...*p. 219*
FOSTER ENGINEERING CO., Newark, N. J. ..*p. 209*
*H. S. B. W.-COCHRANE CORPN., Philadelphia, Pa...*pp. 146, 147*
*JENKINS BROS., 80 White St., New York, N. Y...*pp. 180, 181*
*KIELEY & MUELLER (Inc.), (''Kieley''), 34 W. 13th St., New York, N. Y...*p. 212*
Klipfel Mfg. Co., 2651 W. Harris St., Chicago, Ill.
*PITTSBURGH VALVE, FOUNDRY & CONSTRUCTION CO., P. O. Box 1016, Pittsburgh, Pa...*pp. 192, 193*
*SCHUTTE & KOERTING CO., 1184 Thompson St., Philadelphia, Pa...*p. 159*
*WHEELER CONDENSER & ENGINEERING CO., Carteret, N. J...*p. 162*
WHEELER, C. H. MFG. CO. (''Multiflex''), Sedgley & Lehigh Aves., Philadelphia, Pa. ..*p. 163*

—Float
AMERICAN STEAM GAUGE & VALVE MFG. CO., Boston, Mass...*pp. 200, 201*
Atlas Valve Co., 282-286 South St., Newark, N. J.
*CRANE CO., 836 S. Michigan Ave., Chicago, Ill...*pp. 170, 171, 172, 173*
DEAN, PAYNE (Ltd.), 103 Park Ave., New York, N. Y...*p. 197*
FISHER GOVERNOR CO. (''Fisher''), Marshalltown, Iowa...*p. 219*
*FORD REGULATOR CORPN., 402 Broome St., New York, N. Y...*p. 176*
FOSTER ENGINEERING CO., Newark, N. J. ..*p. 209*
*HOMESTEAD VALVE MFG. CO., P. O. Box 1754, Pittsburgh, Pa...*p. 177*
*KIELEY & MUELLER (Inc.), (''Kieley''), 34 W. 13th St., New York, N. Y...*p. 212*
Klipfel Mfg. Co., 2651 W. Harrison St., Chicago, Ill
Lewis Steam Specialty & Valve Co., 1533 Cherry St., Philadelphia, Pa.
MASON REGULATOR CO., Boston, Mass... *pp. 214, 215*
Peerless Engineering Co. ,1253 First Natl. Bank Bldg., Chicago, Ill.
*PITTSBURGH VALVE, FOUNDRY & CONSTRUCTION CO., P. O. Box 1016, Pittsburgh, Pa...*pp. 192, 193*
Schade Valve Mfg. Co., 2542 N. American St., Philadelphia, Pa.
*SCHUTTE & KOERTING CO., 1184 Thompson St., Philadelphia, Pa...*p. 159*

—Flow
*H. S. B. W.-COCHRANE CORPN., Philadelphia, Pa...*pp. 146, 147*

—Foot
*BROWN, A. & F. CO., 79 Barclay St., New York, N. Y...*p. 303*
CASH, A. W. CO., Decatur, Ill...*p. 205*
Coffin Valve Co., Neponset, Mass.
COOK, A. D. (Inc.), Lawrenceburg, Ind... *p. 585*
*CRANE CO., 836 S. Michigan Ave., Chicago, Ill...*pp. 170, 171, 172, 173*
Emerson Pump & Valve Co. (Inc.), Alexandria, Va.
La Vergne Pump & Machine Co., 284 N. 5th St., Newark, N. J.
Ludlow Valve Mfg. Co., Troy, N. Y.
Newman Mfg. Co., 79 Barclay St., New York, N. Y.
*PITTSBURGH VALVE, FOUNDRY & CONSTRUCTION CO., P. O. Box 1016, Pittsburgh, Pa...*pp. 192, 193*
WOOD, R. D. & CO., Philadelphia, Pa... *p. 597*

—Gas
SMITH GAS ENGINEERING CO., Dayton, Ohio...*p. 94*

—Gas (Automatic Cut-Off)
Lagonda Mfg. Co., Springfield, Ohio
OVEN EQUIPMENT & MFG. CO., New Haven, Conn...*p. 534*

—Gas (High Pressure)
Oxygen Products Co., 2525 Liberty Ave., Pittsburgh, Pa.

—Gate
American Car & Foundry Co. (''Galyburton''), 165 Broadway, New York, N. Y.
American Valve Co., Coxsackie, N. Y.
Bartlett Hayward Co., Baltimore, Md.
BUCKEYE IRON & BRASS WORKS, Dayton, Ohio...*p. 168*
Chapman Valve Mfg. Co., Indian Orchard, Mass.
CLOW, JAMES B. & SONS, 534 So. Franklin St., Chicago, Ill...*pp. 230, 231*
Coffin Valve Co., Neponset, Mass.
*CRANE CO., 836 S. Michigan Ave., Chicago, Ill...*pp. 170, 171, 172, 173*
Darling Valve & Mfg. Co., Williamsport, Pa.
DOLE VALVE CO., 1923-33 Carroll Ave., Chicago, Ill...*p. 226*
Eddy Valve Co., Waterford, N. Y.
FAIRBANKS CO., 416 Broome St., New York, N. Y...*pp. 174, 175*
Gorton & Lidgerwood Co., 96 Liberty St., New York, N. Y.
Henry, Joshua Iron Works, 75 Fremont St., San Francisco, Cal.
JARECKI MFG. CO., Erie, Pa...*pp. 178, 179*
*JENKINS BROS., 80 White St., New York, N. Y...*pp. 180, 181*
KELLY & JONES CO., Greensburg, Pa...*pp. 182, 183*
Kennedy Valve Mfg. Co., Elmira, N. Y.
Ludlow Valve Mfg. Co., Troy, N. Y.
*LUNKENHEIMER CO. (Clip,'' ''Handy,'' ''Victor''), Cincinnati, Ohio...*pp. 184, 185, 186, 187, 188, 189*
McMann & Taylor Co., 104-106 John St., New York, N. Y.
McNab & Harlin Mfg. Co., Paterson, N. J.
Marsh Valve Co., Erie, Pa.
Milwaukee Valve Co., 139 Burrell St., Milwaukee, Wis.
NATIONAL SUPPLY CO., Toledo, Ohio... *pp. 648, 649*

Digitized by Google

*NELSON VALVE CO., Chestnut Hill, Philadelphia, Pa...*p. 129*
NEWBURGH STEAM BOILER WORKS (P. Delany & Co.), Newburgh, N. Y...*p. 64*
Ohio Injector Co., S. Main St., Wadsworth, Ohio
Pittsburgh Valve & Fittings Co., Barberton, Ohio
*PITTSBURGH VALVE, FOUNDRY & CONSTRUCTION CO., P. O. Box 1016, Pittsburgh, Pa...*pp. 192, 193*
*READING VALVE & FITTINGS CO. (Pratt & Cady Div.), Hartford, Conn...*pp. 194, 195*
Rensselaer Valve Co., Troy, N. Y.
*SCHUTTE & KOERTING CO., 1184 Thompson St., Philadelphia, Pa...*p. 159*
SCOTT VALVE MFG. CO. (''Scott''), Detroit, Mich...*p. 191*
Smith, A. P. Mfg. Co., East Orange, N. J.
Walworth Mfg. Co., First & O Sts., South Boston, Mass.
Western Gas Construction Co., Fort Wayne, Ind.
WOOD, R. D. & CO., Philadelphia, Pa...*p. 597*

—Globe, Angle and Cross

American Ball Valve & Mfg. Co., 572 Franklin St., Detroit, Mich.
American Valve Co. (''Amvalco''), Coxsackie, N. Y.
Bashlin Co., Warren, Pa.
Bayer Valve Co., 4067 Park Ave., St. Louis, Mo.
Belfield, H. Co., 435 N. Broad St., Philadelphia, Pa.
Belknap Manufacturing Co., 149 Water St., Bridgeport, Conn.
BUCKEYE IRON & BRASS WORKS, Dayton, Ohio...*p. 168*
Burlington Brass Works (''Knopak''), Burlington, Wis.
CLOW, JAMES B. & SONS, 534 So. Franklin St., Chicago, Ill...*pp. 230, 231*
*CRANE CO., 836 S. Michigan Ave., Chicago, Ill...*pp. 170, 171, 172, 173*
*CROSBY STEAM GAGE & VALVE CO., 40 Central St., Boston, Mass...*pp. 202, 208*
Detroit Brass & Malleable Works, 331 Holden Ave., Detroit, Mich.
DOLE VALVE CO., 1923-33 Carroll Ave., Chicago, Ill...*p. 226*
ECKENROTH VALVE & MFG. CO., 156-158 Monarroe St., Manayunk, Philadelphia, Pa...*p. 169*
Edward Valve & Mfg. Co., East Chicago, Ind.
FAIRBANKS CO., 416 Broome St., New York, N. Y...*pp. 174, 175*
FULTON CO. (''Sylphon''), Knoxville, Tenn...*pp. 218, 219*
*ILLINOIS ENGINEERING CO. (Eclipse), Chicago, Ill...*pp. 210, 211*
JARECKI MFG. CO., Erie, Pa...*pp. 178, 179*
*JENKINS BROS., 80 White St., New York, N. Y...*pp. 180, 181*
KELLY & JONES CO., Greensburg, Pa...*pp. 182, 183*
Kennedy Valve Mfg. Co., Elmira, N. Y.
*LUNKENHEIMER CO. (''Ferrenewo,'' ''Renewo''), Cincinnati, Ohio...*pp. 184, 185, 186, 187, 188, 189*
McMann & Taylor Co., 104-106 John St., New York, N. Y.
McNab & Harlin Mfg. Co., Paterson, N. J.
McRae & Roberts Co., 211 Campbell Ave., Detroit, Mich.
Marsh Valve Co., Erie, Pa.
Milwaukee Valve Co., 139 Burrell St., Milwaukee, Wis
NATIONAL SUPPLY CO., Toledo, Ohio...*pp. 648, 649*
*NELSON VALVE CO., Chestnut Hill, Philadelphia, Pa...*p. 129*
New Bedford Valve Mfg. Co., New Bedford, Mass.
NEWBURGH STEAM BOILER WORKS, (P. Delany & Co.), Newburgh, N. Y...*p. 64*
Ohio Brass Co., Mansfield, Ohio
Ohio Injector Co., S. Main St., Wadsworth, Ohio
Pittsburgh Valve & Fittings Co., Barberton, Ohio
*PITTSBURGH VALVE, FOUNDRY & CONSTRUCTION CO., P. O. Box 1016, Pittsburgh, Pa...*pp. 192, 193*
Powell, William Co., 2525 Spring Grove Ave., Cincinnati, Ohio
Protected Seat Valve Co., Peoples Bank Bldg., Pittsburgh, Pa.
*READING VALVE & FITTINGS CO. (Pratt & Cady Div.), Hartford, Conn...*pp. 194, 195*
*RICHARDSON-PHENIX CO. (''Nokut''), 126 Reservoir Ave., Milwaukee, Wis...*pp. 248, 249*
SCOTT VALVE MFG. CO. (''Scott''), Detroit, Mich...*p. 191*
Star Brass Mfg. Co., 53 Oliver St., Boston, Mass.
United Brass Mfg. Co., Cleveland, Ohio
Williams, D. T. Valve Co., Spring Grove Ave. & Township St., Cincinnati, Ohio

—Hose

*CRANE CO., 836 S. Michigan Ave., Chicago, Ill...*pp. 170, 171, 172, 173*
*JENKINS BROS., 80 White St., New York, N. Y...*pp. 180, 181*
KELLY & JONES CO., Greensburg, Pa...*pp. 182, 183*
*LUNKENHEIMER CO., Cincinnati, Ohio...*pp. 184, 185, 186, 187, 188, 189*
*READING VALVE & FITTINGS CO. (Pratt & Cady Div.), Hartford, Conn...*pp. 194, 195*
SCOTT VALVE MFG. CO. (''Scott''), Detroit, Mich...*p. 191*

—Hydraulic

*ALLIS-CHALMERS MFG. CO., Milwaukee, Wis...*pp. 28, 29*
*ASHTON VALVE CO., 161 First St., Cambridge, Boston, Mass...*p. 287*
BUCKEYE IRON & BRASS WORKS, Dayton, Ohio...*p. 168*
BURROUGHS, CHARLES CO. (The), Newark, N, J...*p. 590*
Cadman, A. W. Mfg. Co., 2814 Smallman St., Pittsburgh, Pa.
CASH, A. W. CO., Decatur, Ill...*p. 205*
*CRAMP, WM. & SONS SHIP & ENGINE BLDG. (''Johnson''), Richmond & Norris Sts., Philadelphia, Pa...*pp. 30, 31*
*CRANE CO., 836 S. Michigan Ave., Chicago, Ill...*pp. 170, 171, 172, 173*
*CROSBY STEAM GAGE & VALVE CO., 40 Central St., Boston, Mass...*pp. 202, 208*
Dominion Engineering Works, Ltd., P. O. Box 2799, Montreal, Quebec, Canada
ELMES, CHAS. F. ENGINEERING WORKS, 215 N. Morgan St., Chicago, Ill...*p. 591*
FAIRBANKS CO., 416 Broome St., New York, N. Y...*pp. 174, 175*
FAIRBANKS, MORSE & CO., 900 S. Wabash Ave., Chicago, Ill...*p. 41*
Hennebohle, F. Co., 81st St. & S. Chicago Ave., S. Chicago, Ill.
*HOMESTEAD VALVE MFG. CO., P. O. Box 1754, Pittsburgh, Pa...*p. 177*
HYDRAULIC PRESS MFG. CO. (The), Mount Gilead, Ohio...*p. 593*
JARECKI MFG. CO., Erie, Pa...*pp. 178, 179*
*JENKINS BROS., 80 White St., New York, N. Y...*pp. 180, 181*
KELLY & JONES CO., Greensburg, Pa...*pp. 182, 183*
LARNER JOHNSON VALVE & ENGRG. CO., Widener Bldg., Philadelphia, Pa...*p. 589*

Digitized by Google

VALVES (Continued)

Ludlow Valve Mfg. Co., Troy, N. Y.
*LUNKENHEIMER CO., Cincinnati, Ohio... *pp. 184, 185, 186, 187, 188, 189*
*PITTSBURGH VALVE, FOUNDRY & CONSTRUCTION CO., P. O. Box 1016, Pittsburgh, Pa...*pp. 192, 193*
Protected Seat Valve Co., Peoples Bank Bldg., Pittsburgh, Pa.
*READING VALVE & FITTINGS CO. (Pratt & Cady Div.), Hartford, Conn...*pp. 194, 195*
*READING VALVE & FITTINGS CO., Reading Division, Reading, Pa...*pp. 238, 239*
ROBERTSON, JOHN, & CO., 133 Water St., Brooklyn, N. Y...*p. 595*
*SCHUTTE & KOERTING CO., 1184 Thompson St., Philadelphia, Pa...*p. 159*
Utility Mfg. Co., Cudahy, Wis.
*VOGT, HENRY MACHINE CO., Louisville, Ky...*pp. 632, 633*
WATSON-STILLMAN CO., 35 Church St., New York, N. Y...*p. 596*
Wilfert, John Co., 258 Broadway, New York, N. Y.
Williams, Franklin (Inc.), 39 Cortlandt St., New York, N. Y.
WOOD, R. D. & CO., Philadelphia, Pa...*p. 597*
Wood, William H., Media, Pa.
*YARNALL-WARING CO. ("Yarway"), 7603-20 Queen St., Chestnut Hill, Philadelphia, Pa...*p. 196*

—Hydraulic Operating

BURROUGHS, CHARLES CO. (The), Newark, N. J...*p. 590*
CASH, A. W., CO., Decatur, Ill...*p. 205*
*CRANE CO., 836 S. Michigan Ave., Chicago, Ill...*pp. 170, 171, 172, 173*
FOSTER ENGINEERING CO., Newark, N. J...*p. 209*
GALLAND-HENNING MFG. CO., Milwaukee, Wis...*p. 592*
*HOMESTEAD VALVE MFG. CO., P. O. Box 1754, Pittsburgh, Pa...*p. 177*
HYDRAULIC PRESS MFG. CO., Mount Gilead, Ohio...*p. 593*
*JENKINS BROS., 80 White St., New York, N. Y...*pp. 180, 181*
Ludlow Valve Mfg. Co., Troy, N. Y.
*LUNKENHEIMER CO., Cincinnati, Ohio... *pp. 184, 185, 186, 187, 188, 189*
METALWOOD MFG. CO., Detroit, Mich...*p. 594*
*PITTSBURGH VALVE, FOUNDRY & CONSTRUCTION CO. ("Tanner," "Aiken," "Stuart"), P. O. Box 1016, Pittsburgh, Pa...*pp. 192, 193*
*READING VALVE & FITTINGS CO. (Pratt & Cady Div.), Hartford, Conn...*pp. 194, 195*
*SCHUTTE & KOERTING CO., 1184 Thompson St., Philadelphia, Pa...*p. 159*
WATSON-STILLMAN CO., 35 Church St., New York, N. Y...*p. 596*
WOOD, R. D. & CO., Philadelphia, Pa...*p. 597*
*YARNALL-WARING CO. ("Yarway"), 7603-20 Queen St., Chestnut Hill, Philadelphia, Pa...*p. 196*

—Lead

*SCHUTTE & KOERTING CO., 1184 Thompson St., Philadelphia, Pa...*p. 159*

—Lead Lined

*SCHUTTE & KOERTING CO., 1184 Thompson St., Philadelphia, Pa...*p. 159*

—Needle

Standard Calorimeter Co., East Moline, Ill.

—Non-Return

*CRANE CO., 836 S. Michigan Ave., Chicago, Ill...*pp. 170, 171, 172, 173*
*CROSBY STEAM GAGE & VALVE CO., 40 Central Ave., Cleveland, Ohio...*pp. 202, 208*
Edward Valve & Mfg. Co., East Chicago, Ind.
*FORD REGULATOR CORPN., 402 Broome St., New York, N. Y...*p. 176*
FOSTER ENGINEERING CO., Newark, N. J...*p. 209*
Golden-Anderson Valve Specialty Co., 1228 Fulton Bldg., Pittsburgh, Pa.
*ILLINOIS ENGINEERING CO. (Eclipse), Chicago, Ill...*pp. 210, 211*
*JENKINS BROS., 80 White St., New York, N. Y...*pp. 180, 181*
KELLY & JONES CO., Greensburg, Pa...*pp. 182, 183*
*KIELEY & MUELLER (Inc.), ("Kieley"), 34 W. 13th St., New York, N. Y...*p. 212*
Locke Regulator Co., 76 North St., Salem, Mass.
*LUNKENHEIMER CO., Cincinnati, Ohio... *pp. 184, 185, 186, 187, 188, 189*
*NELSON VALVE CO., Chestnut Hill, Philadelphia, Pa...*p. 129*
New Bedford Valve Mfg. Co., New Bedford, Mass.
*PITTSBURGH VALVE, FOUNDRY & CONSTRUCTION CO., P. O. Box 1016, Pittsburgh, Pa...*pp. 192, 193*
*READING VALVE & FITTINGS CO. (Pratt & Cady Div.), Hartford, Conn...*pp. 194, 195*
Ruggles-Klingham Mfg. Co., 200 Devonshire St., Boston, Mass.
*SCHUTTE & KOERTING CO., 1184 Thompson St., Philadelphia, Pa...*p. 159*

—Oil-Firing

CASH, A. W., CO., Decatur, Ill...*p. 205*

—Piston

KELLY & JONES CO., Greensburg, Pa...*pp. 182, 183*
Young, C. C., Jersey Shore, Pa.

—Plug

Cadman, A. W. Mfg. Co., 2814 Smallman St., Pittsburgh, Pa.
Coldwell-Wilcox Co., Newburgh, N. Y.
FAIRBANKS CO., 416 Broome St., New York, N. Y...*pp. 174, 175*
*HOMESTEAD VALVE MFG. CO., P. O. Box 1754, Pittsburgh, Pa...*p. 177*
KELLY & JONES CO., Greensburg, Pa...*pp. 182, 183*
Merrill Co. ("Merco Nordstrom"), 121 Second St., San Francisco, Cal.
*PITTSBURGH VALVE, FOUNDRY & CONSTRUCTION CO., P. O. Box 1016, Pittsburgh, Pa...*pp. 192, 193*
*READING VALVE & FITTINGS CO. (Pratt & Cady Div.), Hartford, Conn...*pp. 194, 195*
Young, C. C., Jersey Shore, Pa

—Plunger

LARNER JOHNSON VALVE & ENGRG. CO., Widener Bldg., Philadelphia, Pa...*p. 589*

—Pop Safety

AMERICAN STEAM GAUGE & VALVE MFG. CO., Boston, Mass...*pp. 200, 201*
*ASHTON VALVE CO., 161 First St., Cambridge, Boston, Mass...*p. 287*
CASH, A. W., CO., Decatur, Ill...*p. 205*
Coale Muffler & Safety Valve Co., 325 E. Oliver St., Baltimore, Md.
*CRANE CO., 836 S. Michigan Ave., Chicago, Ill...*pp. 170, 171, 172, 173*
*CROSBY STEAM GAUGE & VALVE CO., 40 Central St., Boston, Mass...*pp. 202, 208*
KELLY & JONES CO., Greensburg, Pa...*pp. 182, 183*
Kunkle Valve Co., Fort Wayne, Ind.
LONERGAN, J. E., CO., 211-215 Race St., Philadelphia, Pa...*pp. 203, 289*
*LUNKENHEIMER CO. ("Duplex"), Cincinnati, Ohio...*pp. 184, 185, 186, 187, 188, 189*

Digitized by Google

McRae & Roberts Co., 211 Campbell Ave., Detroit, Mich.
SCOTT VALVE MFG. CO. (''Scott''), Detroit, Mich...*p. 191*

—Pump

American Ball Valve & Mfg. Co., 572 Franklin St., Detroit, Mich.
AMERICAN VULCANIZED FIBRE CO., Wilmington, Del...*p. 417*
Brandt, Randolph, 66 Cortlandt St., New York, N. Y.
Cincinnati Rubber Mfg. Co., Cincinnati, O.
Dick, R. & J. Co. (Inc.), Passaic, N. J.
Eastern Machinery & Equipment Co. (Inc.), 1036 Commercial Trust Bldg., Philadelphia, Pa.
Edison Packing & Sales Co., 234 State St., Boston, Mass.
Excelsior Valve Co., 106-108 Fulton St., New York, N. Y.
Federal Metallic Packing Co., 48 Hanover St., Boston, Mass.
Hill Pump Valve Co., Delmot & Knox Ave., Chicago, Ill.
*JENKINS BROS., 80 White St., New York, N. Y...*pp. 180, 181*
*JOHNS-MANVILLE, INC., New York, N. Y. ...*p. 244*
KELLY & JONES CO., Greensburg, Pa... *pp. 182, 183*
La Favorite Rubber Mfg. Co., Paterson, N. J.
Lake Erie Mfg. Co., Inc., 192-198 Chicago St., Buffalo, N. Y.
Quaker City Rubber Co., 629 Market St., Philadelphia, Pa.
*RICHARDSON-PHENIX CO., 126 Reservoir Ave., Milwaukee, Wis...*pp, 248, 249*
U. S. Indestructible Gasket Co., 50 Church St., New York, N. Y.
Voorhees Rubber Mfg. Co., 18-50 Bostwick Ave., Jersey City, N. J.

—Radiator

AMERICAN DISTRICT STEAM CO. (''Adsco''), North Tonawanda, N. Y...*p. 242*
Belknap Manufacturing Co., 149 Water St., Bridgeport, Conn.
Bishop & Babcock Co., E. 49th & Hamilton Ave., Cleveland, Ohio.
BUCKEYE IRON & BRASS WORKS, Dayton, Ohio...*p. 168*
Commonwealth Brass Corpn. (''Standard''), Commonwealth Ave. & Grand Trunk Ry., Detroit, Mich.
*CRANE CO., 836 S. Michigan Ave., Chicago, Ill...*pp. 170, 171, 172, 173*
Detroit Lubricator Co., Detroit, Mich.
DOLE VALVE CO. 1923-33 Carroll Ave., Chicago, Ill...*p. 226*
DUNHAM, C. A. CO., 230 East Ohio St., Chicago, Ill...*p. 227*
FULTON CO. (''Sylphon''), Knoxville, Tenn...*pp. 218, 219*
Gorton & Lidgerwood Co., 96 Liberty St., New York, N. Y.
Hoffman Specialty Co., Waterbury, Conn.
*JENKINS BROS., 80 White St., New York, N. Y...*pp. 180, 181*
*JOHNS-MANVILLE (Inc.), New York, N. Y. ...*p. 244*
KELLY & JONES CO., Greensburg, Pa... *pp. 182, 183*
*LUNKENHEIMER CO., Cincinnati, Ohio... *pp. 184, 185, 186, 187, 188, 189*
Magee Valve Co. (Inc.), 136 Beekman St., New York, N. Y.
Marsh Valve Co., Erie, Pa.
Milwaukee Valve Co., 139 Burrell St., Milwaukee, Wis.
Ohio Injector Co., S. Main St., Wadsworth, Ohio.
*POWERS REGULATOR CO., 995 Architects Bldg., New York, N. Y...*pp. 222, 223*
*READING VALVE & FITTINGS CO. (Pratt & Cady Div.), Hartford, Conn...*pp. 194, 195*
SCOTT VALVE MFG. CO. (''Scott'' ''J. D''), Detroit, Mich...*p. 191*

—Radiator (Modulated)

Marsh Valve Co., Erie, Pa.

—Radiator (Packless)

Commonwealth Brass Corp'n., Commonwealth Ave. & Grand Trunk Ry., Detroit, Mich.
DUNHAM, C. A. CO., 1710 Fisher Bldg., Chicago, Ill...*p. 227*
FULTON CO. (''Sylphon''), Knoxville, Tenn...*pp. 218, 219*
McAlear Mfg. Co., 1901 So. Western Ave., Chicago, Ill.
Marsh Valve Co., Erie, Pa.
PIERCE, BUTLER & PIERCE MFG. CORP'N., 437 East 162nd St., New York, N. Y...*p. 204*

—Reducing

AMERICAN DISTRICT STEAM CO. (''Perfection''), North Tonawanda, N. Y...*p. 242*
Atlas Valve Co, 282-286 South St., Newark, N. J.
Belfield, H. Co., 435 N. Broad St., Philadelphia, Pa.
CASH, A. W. CO., Decatur, Ill...*p. 205*
Chaplin-Fulton Mfg. Co. (''Fulton''), 28-36 Penn. Ave., Pittsburgh, Pa.
*CRANE CO., 836 S. Michigan Ave., Chicago, Ill...*pp. 170, 171, 172, 173*
Davis, G. M. Regulator Co., 439 Milwaukee Ave., Chicago, Ill.
D'ESTE, JULIAN CO., 26 Canal St., Boston, Mass...*pp. 206, 207*
DUNHAM, C. A. CO., 230 East Ohio Street, Chicago, Ill...*p. 227*
ELECTROLABS CO., Pittsburgh, Pa...*p. 536*
FISHER GOVERNOR CO. (''Fisher''), Marshalltown, Iowa..*p. 219*
*FORD REGULATOR CORP'N., 402 Broome St., New York, N. Y...*p. 176*
FOSTER ENGINEERING CO., Newark, N. J. ...*p. 209*
FULTON CO. (''Sylphon''), Knoxville, Tenn...*pp. 218, 219*
*ILLINOIS ENGINEERING CO. ('Eclipse'), Chicago, Ill...*pp. 210, 211*
*JENKINS BROS, 80 White St., New York, N. Y...*pp. 180, 181*
JOHNSON SERVICE CO., Milwaukee, Wis. ...*pp. 220, 221*
KELLY & JONES CO., Greensburg, Pa...*pp. 182, 183*
*KIELEY & MUELLEER (Inc.) (''Kieley''), 34 West 13th St., New York, N. Y...*p. 212*
LESLIE CO., Lyndhurst, N. J...*p. 213*
Locke Regulator Co., 76 North St., Salem, Mass.
Lytton Mfg. Corp'n., Franklin, Va.
McAlear Mfg. Co., 1901 So. Western Ave., Chicago, Ill.
MASON REGULATOR CO., Boston Mass. ...*pp. 214, 215*
*PITTSBURGH VALVE, FOUNDRY & CONSTRUCTION CO., P. O. Box 1016, Pittsburgh, Pa...*pp. 192, 193*
*POWERS REGULATOR CO., 995 Architects Bldg., New York, N. Y...*pp. 222, 223*
Schade Valve Mfg. Co., 2542 N. American St., Philadelphia, Pa.
*SCHUTTE & KOERTING CO., 1184 Thompson St., Philadelphia, Pa...*p. 159*
Squires, C. E. Co., E. 40th St. & Kelley Ave., Cleveland, Ohio
TAGLIABUE, C. J. MFG. CO., 18-88 83rd St., Brooklyn, N. Y...*p. 296*
Waters Governors Co., 141 Milk St., Boston, Mass.
Watson & McDaniel Co., 142 N. 7th St., Philadelphia, Pa.

Digitized by Google

VALVES (Continued)

Watts Regulator Co., 250-252 Lowell St., Lawrence, Mass.
Western Kieley Steam Specialty Co., 116-122 W. Illinois, Chicago, Ill.
Witt, G. E. Co. (Inc.), 862-64 Howard St., San Francisco, Cal.

—Regulating

Belfield H. Co., 435 N. Broad St., Philadelphia, Pa.
Boylston Steam Specialty Co., 116 W. Illinois St., Chicago, Ill.
CASH, A. W. CO., Decatur, Ill...*p. 205*
*CRANE CO., 836 S. Michigan Ave., Chicago, Ill...*pp. 170, 171, 172, 173*
DEAN, PAYNE (Ltd.), 103 Park Ave., New York, N. Y...*p. 197*
D'ESTE, JULIAN CO., 26 Canal St., Boston, Mass...*pp. 206, 207*
Dorn & Marcellus Co., Kinsey & Hedge Sts., Philadelphia, Pa.
FISHER GOVERNOR CO. (''Fisher''), Marshalltown, Iowa..*p. 219*
*FORD REGULATOR CORP'N., 402 Broome St., New York, N. Y...*p. 176*
FOSTER ENGINEERING CO., Newark, N. J...*p. 209*
FULTON CO. (''Sylphon''), Knoxville, Tenn...*pp. 218, 219*
*ILLINOIS ENGINERRING CO. (''Eclipse''), Chicago, Ill...*pp. 210, 211*
*JENKINS BROS., 80 White St., New York, N. Y...*pp. 180, 181*
KELLY & JONES CO., Greensburg, Pa...*pp. 182, 183*
*KIELEY & MUELLER (Inc.) (''Kieley''), 34 W. 13th St., New York, N. Y...*p. 212*
LARNER JOHNSON VALVE & ENGRG. CO., Widener Bldg., Philadelphia, Pa...*p. 589*
LESLIE CO., Lyndhurst, N. J...*p. 213*
*LUNKENHEIMER CO., Cincinnati, Ohio ..*pp. 184, 185, 186, 187, 188, 189*
MASON REGULATOR CO., Boston, Mass. *pp. 214, 215*
Ohio Brass Co., Mansfield, Ohio
*POWERS REGULATOR CO., 975 Architects Bldg., New York, N. Y...*pp. 222, 223*
Ross Valve Mfg. Co., 4 Oakwood Ave., Troy, N. Y.
Ruggles-Klingham Mfg. Co., 200 Devonshire St., Boston, Mass.
Schade Valve Mfg. Co., 2542 N. American St., Philadelphia, Pa.
SIMPLEX VALVE & METER CO., Philadelphia, Pa...*p. 278*
Western Kieley Steam Specialty Co., 116-122 W. Illinois, Chicago, Ill.

—Relief (Ammonia)

*ASHTON VALVE CO., 161 First Street, Cambridge, Boston, Mass...*p. 287*
YORK MFG. CO., York, Pa...*p. 631*

—Relief (Water)

AMERICAN STEAM GAUGE & VALVE CO., Boston, Mass...*pp. 200, 201*
*ASHTON VALVE CO., 161 First Street, Cambridge, Boston, Mass...*p. 287*
BUCKEYE IRON & BRASS WORKS, Dayton, Ohio..*p. 168*
CASH, A. W. CO., Decatur, Ill...*p. 205*
*CRANE CO., 836 S. Michigan Ave., Chicago, Ill...*pp. 170, 171, 172, 173*
*CROSBY STEAM GAGE & VALVE CO., 40 Central St., Boston, Mass...*pp. 202, 208*
FISHER GOVERNOR CO., Marshalltown, Iowa..*p. 208*
FOSTER ENGINEERING CO., Newark, N. J...*p. 209*
LONERGAN, J. E. CO., 211-215 Race St., Philadelphia, Pa...*pp. 203, 289*
*LUNKENHEIMER CO., Cincinnati, Ohio ..*pp. 184, 185, 186, 187, 188, 189*
MORRISON BROS., Dubuque, Iowa..*p. 658*
Munkle Valve Co., Fort Wayne, Ind.
*PITTSBURGH VALVE, FOUNDRY & CONSTRUCTION CO., P. O. Box 1016, Pittsburg, Pa...*pp. 192, 193*
SCOTT VALVE MFG. CO. (''Scott''), Detroit, Mich...*p. 191*
Triumph Valley Mfg. Co., P. O. Box 327, Mansfield, Ohio

—Reversing (Furnace)

Blair Engineering Co., 17 Battery Place, New York, N. Y.
*HOMESTEAD VALVE MFG. CO., P. O. Box 1754, Pittsburgh, Pa...*p. 177*
Sterrit-Thomas Fndry Co., 32nd & Smallman Sts., Pittsburgh, Pa.

—Rubber

GOODRICH, B. F. RUBBER CO., Akron, Ohio..*pp. 258, 259*
*JENKINS BROS., 80 White St., New York, N. Y...*pp. 180, 181*
Knowlton, Geo. W. Rubber Co., 60 Pearl St., Boston, Mass.

—Safety

AMERICAN STEAM GAUGE & VALVE MFG. CO., Boston, Mass...*pp. 200, 201*
*ASHTON VALVE CO., 161 First St., Cambridge, Boston, Mass...*p. 287*
BUCKEYE IRON & BRASS WORKS, Dayton, Ohio..*p. 168*
Consolidated Safety Valve Co., 119 W. 40th St., New York, N. Y.
*CRANE CO., 836 S. Michigan Ave., Chicago, Ill...*pp. 170, 171, 172, 173*
*CROSBY STEAM GAGE & VALVE CO., 40 Central St., Boston, Mass...*pp. 202, 208*
*JENKINS BROS., 80 White St., New York, N. Y...*pp. 180, 181*
KELLY & JONES CO., Greensburg, Pa...*pp. 182, 183*
Locke Regulator Co., 76 North St., Salem, Mass.
*LUNKENHEIMER CO., Cincinnati, Ohio *pp. 184, 185, 186, 187, 188, 189*
Star Brass Mfg. Co., 53 Oliver St., Boston, Mass.
Triumph Valve Mfg. Co., P. O. Box 327, Mansfield, Ohio

—Safety, Air

WESTINGHOUSE TRACTION BRAKE CO., Wilmerding, Pa...*pp. 550, 551*

—Safety (Oil Burner)

Lalor Fuel Oil System Co. of Md. (Inc.) (''Lalor''), 527-33 Colvin St., Baltimore, Md.

—Shear

Coldwell-Wilcox Co., Newburgh, N. Y.

—Stock (Pulp)

Sturgis Machine Co., Sturgis, Mich.

—Stop and Check

(See Valves, Non-Return)

—Superheated Steam (Steel)

*ASHTON VALVE CO., 161 First St., Cambridge, Boston, Mass...*p. 287*
CASH, A. W. CO., Decatur, Ill...*p. 205*
*CRANE CO., 836 S. Michigan Ave., Chicago, Ill...*pp. 170, 171, 172, 173*
D'ESTE, JULIAN CO., 26 Canal St., Boston, Mass...*pp. 206, 207*
ECKENROTH VALVE & MFG. CO., 156-158 Conarroe Street, Manayunk, Philadelphia, Pa...*p. 169*
Edward Valve & Mfg. Co., East Chicago, Ind.
*HOMESTEAD VALVE MFG. CO., P. O. Box 1754 Pittsburgh, Pa...*p. 177*
*JENKINS BROS., 80 White St., New York, N. Y...*pp. 180, 181*
KELLY & JONES CO., Greensburg, Pa...*pp. 182, 183*
*LUNKENHEIMER CO., Cincinnati, Ohio ..*pp. 184, 185, 186, 187, 188, 189*

Digitized by Google

National Valve & Mfg. Co., Pittsburgh, Pa.
*NELSON VALVE CO., Chestnut Hill, Philadelphia, Pa...*p. 129*
*PITTSBURGH VALVE, FOUNDRY & CONSTRUCTION CO., P. O. Box 1016, Pittsburgh, Pa...*pp. 192, 193*
Protected Seat Valve Co., Peoples Bank Bldg., Pittsburgh, Pa.
Reading Steel Casting Co., Reading, Pa.
*READING VALVE & FITTINGS CO., (Pratt & Cady Div.), Hartford, Conn...*pp. 194, 195*
*READING VALVE & FITTINGS CO. (Reading Division), Reading, Pa...*pp. 238, 239*
*RICHARDSON-PHENIX CO., 126 Reservoir Ave., Milwaukee, Wis...*p.. 248, 249*
*VOGT, HENRY MACHINE CO., Louisville, Ky...*pp. 632, 633*
Wilfert, John Co., 258 Broadway, New York, N. Y.

—Thermostatically operated
DEAN, PAYNE (Ltd.), 103 Park Ave., New York, N. Y...*p. 197*
Refrigerating Specialties Co., 9. S. Clinton St., Chicago, Ill.

—Throttle
Bay City Foundry & Machine Co. (''Pendry Balanced''), 26th & Water Sts., Bay City, Mich.
BUCKEYE IRON & BRASS WORKS, Dayton, Ohio..*p. 168*
*CRANE CO., 836 S. Michigan Ave., Chicago, Ill...*pp. 170, 171, 172, 173*
*CROSBY STEAM GAGE & VALVE CO., 40 Central St., Boston, Mass...*pp. 202, 208*
*HOMESTEAD VALVE MFG. CO., P. O. Box 1754, Pittsburgh, Pa...*p. 177*
*JENKINS BROS. 80 White St., New York, N. Y...*pp. 180, 181*
KELLY & JONES CO., Greensburg, Pa. ..*pp. 182, 183*
*LUNKENHEIMER CO., Cincinnati, Ohio ..*pp. 184, 185, 186, 187, 188, 189*
*PITTSBURGH VALVE, FOUNDRY & CONSTRUCTION CO., P. O. Box 1016, Pittsburgh, Pa...*pp. 192, 193*
*SCHUTTTE & KOERTING CO., 1184 Thompson St., Philadelphia, Pa...*p. 159*
SCOTT VALVE MFG. CO. (''Scott & Goldsmith''), Detroit, Mich...*p. 191*

—Trap
AMERICAN STEAM GAUGE & VALVE MFG. CO., Boston, Mass...*pp. 200, 201*
*CRANE CO., 836 S. Michigan Ave., Chicago, Ill...*pp. 170, 171, 172, 173*

—Vacuum-Heating
Bishop & Babcock Co., E. 49th St. & Hamilton Ave., Cleveland, Ohio
*CRANE CO., 836 S. Michigan Ave., Chicago, Ill...*pp. 170, 171, 172, 173*
D. G. C. Trap & Valve Co., 18 E. 41st St., New York, N. Y.
DOLE VALVE CO., 1923-33 Carrol Ave., Chicago, Ill...*p. 226*
Donnelly Systems Co., 9 Murray St., New York, N. Y.
FOSTER ENGINEERING CO., Newark, N. J...*p. 209*
*JENKINS BROS., 80 White St., New York, N. Y...*pp. 180, 181*
KELLY & JONES CO., Greensburg, Pa...*pp. 182, 183*
OPEN COIL HEATER & PURIFIER CO., Indianapolis, Ind...*p. 149*
Peerless Engineering Co., 1253 First Nat'l Bank Bldg., Chicago, Ill.
*SARCO CO. (Inc.), 9 Barclay St., New York, N. Y...*pp. 224, 225*
Trane Co., La Crosse, Wis., New York, N. Y.
Positive Differential System Co., 9 Murray St., New York, N. Y.

VARIABLE SPEED TRANSMISSIONS
(See Transmissions, Variable Speed)

VARNISH (Insulating)
Sterling Varnish Co., 528 Fulton Bldg., Pittsburgh, Pa.

VENEER CUTTING MACHINERY
American-Blakeslee Mfg. Co., Birmingham, Ala.
Merritt Engineering & Sales Co., Lockport, N. Y.

VENTILATING SYSTEMS
*AMERICAN BLOWER CO., Detroit, Mich. *p. 553*
ATMOSPHERIC CONDITIONING CORP'N, 435 Chestnut St., Philadelphia, Pa...*p. 617*
CLARAGE FAN CO., Kalmazoo, Mich...*pp. 556, 557*
Dixie Mfg. Co. (Inc.), Russell St. & B. & O. R. R., Baltimore, Md.
Ilg Electric Ventilating Co., Crawford Ave., near Diversey Boul., Chicago, Ill.
Industrial Air Engineering Co., 310-311 Perry Payne Bldg., Cleveland, Ohio
JEFFREY MFG. CO., 904 N. 4th St., Columbus, Ohio...*pp. 376, 377*
Kernchen Co., 111 W. Washington St., Chicago, Ill.
Lynn Air Conditioning Co., 103 Park Ave., New York, N. Y.
Massachusetts Blower Co., Howard St., Watertown, Mass.
Merrill, C. J. (Inc.), 85 Kennebec St., Portland, Me.
NEW YORK BLOWER CO., Chicago, Ill...*p. 555*
*PANGBORN CORP'N, P. O. Box 859 Hagerstown, Md...*pp. 636, 637*
SKINNER BROS. MFG. CO. (Inc.), 1400-1490 Vandevanter Ave., St. Louis, Mo...*p. 621*
STURTEVANT, B. F. CO., Hyde Park, Boston, Mass...*p. 106*
Western Blower Co., 1800 9th Ave., South, Seattle, Wash.

VENTILATORS, ROOF
Burt Mfg. Co., Akron, Ohio
Carlisle & Gale Co., 5 North St., East Combridge, Mass.
Kernchen Co., 111 W. Washington St., Chicago, Ill.
Pullman Ventilator and Mfg. Co., W. York Ave. & W. M. R. R., York, Pa.
New England Ventilating & Heating Co., 926 Manton Ave., Providence, R. I.
Nightingale & Childs Co., 205 Congress St., Boston, Mass.
Ohio Body Blower Co., 9300 Detroit Ave., Cleveland, Ohio
SKINNER BROS. MFG. CO. (Inc.), 1400-1490 Vandevanter Ave., St. Louis, Mo...*p. 621*
Van Norden, E. Co., 102 Magazine St., Roxbury, Mass.

VIBRATION INDICATING MACHINES
Vibration Specialty Co., Philadelphia, Pa.

VIBRATORS
—Foundry
Berkshire Mfg. Co., 1011 Power Ave., Cleveland, Ohio
MALLEABLE IRON FITTING CO., Branford, Conn...*p. 236*
Nicholls, Wm. H. Co., 2-10 College Place, Brooklyn, N. Y.

—Pneumatic
MALLEABLE IRON FITTINGS CO., Branford, Conn...*p. 236*
Tessmer Machine & Tool Co., 1425-45 Rivard St., Detroit, Mich.
U. S. Molding Machine Co., 968 E. 69th Place, Cleveland, Ohio

Digitized by Google

VIBROMETERS
BIDDLE, JAMES G. ("Jagabi"), 1211-1213 Arch St., Philadelphia, Pa...*p. 298*

VISCOSIMETERS
TAGLIABUE, C. J. MFG. CO. ("Saybolt"), 18-88 33rd St., Brooklyn, N. Y...*p. 296*

VISE ATTACHMENTS
Universal Equalizer Co., 8 East Pearl St., Cincinnati, Ohio

VISES
—Air Operated
Hannifan Mfg. Co., 621-31 S. Kilman Ave., Chicago, Ill.
—Bench
Athol Machine & Foundry Co., Athol, Mass.
Carter & Hakes Machine Co., Winsted, Conn.
Fulton Machine & Vise Co., Lowville, N. Y.
Luther Grinder Mfg. Co., 285 S. Water St., Milwaukee, Wis.
Prentiss Vise Co., 110 Lafayette St., New York, N. Y.
Rock Island Mfg. Co., Rock Island, Ill.
Sanford, F. C. Mfg. Co., Bridgeport, Conn.
Spafford Tool Works ("Supreme"), 10 Hoadley Place, Hartford, Conn.
Upton & Gilman Machine Co., 587 Middlesex St., Lowell, Mass.
Western Tool & Mfg. Co., Springfield, Ohio
—Divided Machine
Zernickow, O. ("O Z"), 15 Park Row, New York, N. Y.
—Drill Press
Bicknell Mfg. & Supply Co., Janesville, Wis.
Graham Mfg. Co., Providence, R. I.
HOGGSON & PETTIS MFG. CO., New Haven, Conn...*pp. 512, 513, 514*
Nestor Mfg. Co. (Inc.), 40 W. 13th St., New York, N. Y.
NEWHALL CHAIN FORGE & IRON CO., 90 West St., New York, N. Y...*p. 410*
Skinner Chuck Co., New Britain, Conn.
—Machine Tool
Bridgeport Engineering Co., Bridgeport, Conn.
Brown Engineering Co., Reading, Pa.
Hartford Specialty Machinery Co., 287 Homestead Ave., Hartford, Conn.
Production Equipment Co. ("Ketchum"), 856 Broad St., Bridgeport, Conn.
Spafford Tool Works (Supreme), Hartford, Conn.
Yost Mfg. Co., Meadville, Pa.
—Milling Machine
Nester Mfg. Co., 40 W. 13th St., New York, N. Y.
Frank G. Payson Co. ("Logan"), 9 So. Clinton St., Chicago, Ill.
Tomkins-Johnson Co., Jackson, Mich.
—Pipe
*CRANE CO., 836 S. Michigan Ave., Chicago, Ill...*pp. 170, 171, 172, 173*
Fulton Machine & Vise Co., Lowville, N. Y.
Prentiss Vise Co., 110 Lafayette St., New York, N. Y.
Reed Mfg. Co., Erie, Pa.
Saunders', D. & Sons (Inc.), 21 Atherton St., Yonkers, N. Y.
Spencer Regulator Co. ("Spencer"), Cor. Derby & Liberty Sts., Salem, Mass.
WILLIAMS, J. H. & CO., 70 Richards St., Brooklyn, N. Y...*p. 517*
—Watchmakers
LOWELL WRENCH CO., 54 Commercial St., Worcester, Mass...*p. 516*
—Wood Working
Emmert Mfg. Co., Waynesboro, Pa.
Prentiss Vise Co., 110 Lafayette St., New York, N. Y.

VOLTMETERS
BIDDLE, JAMES G., 1211-1213 Arch St., Philadelphia, Pa...*p. 298*
BRISTOL CO., Waterbury Conn...*p. 291*
Hicock Electrical Instrument Co., 10514 Dupont Ave., Cleveland, Ohio
*GENERAL ELECTRIC CO., Schenectady, N. Y...*pp. 18, 19, 20, 21*
Jewell Electrical Instrument Co., 1650 Walnut St., Chicago, Ill.
Pignolet, Louis M., 78 Cortlandt St., New York, N. Y.
*WESTINGHOUSE ELECTRIC & MFG. CO., East Pittsburgh, Pa...*pp. 160, 161*

VULCANIZERS
BIGGS BOILER WORKS CO., Case Ave. & Newton St., Akron, Ohio...*p. 650*
KOVEN, L. O. & BROTHER, 154 Ogden Ave., Jersey City, N. J...*p. 605*
LEBANON BOILER WORKS (J. K. Petty & Co., Inc.), 6 So. 15th St., Philadelphia, Pa...*pp. 78, 79*
New Haven Boiler Works (Inc.), New Haven, Conn.
SMITH, SAMUEL & SON., Paterson, N. J. ...*p. 88*
Williams Foundry & Machine Co., Akron, Ohio

W

WALL BRACKETS
DODGE SALES & ENGINEERING CO., Mishawaka, Inc...*pp. 42, 43, 326, 327, 328, 329*
*FALLS CLUTCH & MACHINERY CO., Cuyahoga Falls, Ohio...*p. 330*
*MEDART PATENT PULLEY CO., St. Louis, Mo...*p. 333*

WASHERS
—Cast Iron
Bosworth Ard Machine & Fndry Co. (Inc.), Anniston, Ala.
Circle Stamping & Mfg. Co., 245 Cortlandt St., Bellevue, N. J.
Wrought Washer Mfg. Co., 54 South Bay St., Milwaukee, Wis.
—Copper
BARNES, WALLACE CO., Bristol, Conn. ...*p. 519*
Gasket Supply Co., 1780 Ludlow St., Philadelphia, Pa.
Guillot Metal Gasket & Supply Co. ("Guillott"), 24 S. Clinton St., Chicago, Ill.
—Felt
Booth Felt Co. (Inc.), 440-450 14th St., Brooklyn, N. Y.
—Lead
Guillott Metal Gasket & Supply Co. ("Guillott"), 24 S. Clinton St., Chicago, Ill.
—Leather
Eagle Counter & Leather Co., 414 E. 8th St., Cincinnati, Ohio
SCHIEREN, CHAS. A. CO., 30-38 Ferry St., New York, N. Y...*pp. 362, 363*
—Lock
National Lock Washer Co., Newark, N. J.
Positive Lock Washer Co., Newark, N. J.
—Oil-less
BOUND BROOK OIL-LESS BEARING CO., Bound Brook, N. J...*p. 336*
—Rubber
GOODRICH, B. F. RUBBER CO., Akron, Ohio...*pp. 258, 259*
*JENKINS BROS., 80 White St., New York, N. Y...*pp. 180, 181*
—Spring
BARNES, WALLACE CO., Bristol, Conn. ...*p. 519*
—Steel
AUBURN BALL BEARING CO., 22 Elizabeth St., Rochester, N. Y...*p. 340*

Digitized by Google

Circle Stamping & Mfg. Co., 245 Cortlandt St., Belleville, N. J.
Cleveland Wrought Products Co., 3590 West 58th St., Cleveland, Ohio
STANDARD SHOP EQUIPMENT CO., 23rd St. & Hunting Park Ave., Philadelphia, Pa...*p. 515*
Worcester Stamped Metal Co., 9 Hunt St., Worcester, Mass.

—Thrust
Globe Mach. & Stamping Co., 1254 W. 76th St., Cleveland, Ohio
*GWILLIAM CO., 23 Flatbush Ave., Brooklyn, N. Y...*pp. 356, 357, 358*

—Vulcanized Fibre
AMERICAN VULCANIZED FIBRE CO., Wilmington, Del...*p. 417*
*CONTINENTAL FIBRE CO., Newark, Del. ..*p. 418*
DIAMOND STATE FIBRE CO., Bridgeport, Pa...*p 420*
*JOHNS-MANVILLE (Inc.), New York, N. Y...*p. 244*
Wilmington Fibre Specialty Co., Wilmington, Del.

—Wrought
COLUMBUS BOLT WORKS CO., Columbus, Ohio..*p. 522*
Hall's, Samuel Sons, 229 W. 10th St., New York, N. Y.
Mason, Jos. M. Machine Co. (Inc.), 2305-13 N. Marshall St., Philadelphia, Pa.
Wrought Washer Mfg. Co., 54 South Bay St., Milwaukee, Wis.

WASHING AND SCREENING MACHINERY
JEFFREY MFG. CO., 904 N. 4th St., Columbus, Ohio..*pp. 376, 377*

WASHING MACHINES

—Blue Print
Revolute Machine Co., 417 E. 93rd St., New York, N. Y.

—Metal Parts
Crescent Washing Machine Co. ("Crescent"), 79 Beechwood Ave., New Rochelle, N. Y.

—Wood
Carthage Machine Co., Carthage, N. Y.

WASTE WASHING CENTRIFUGALS
(See Centrifugals, Oil and Waste)

WATCHES

—Stop
Stein & Ellbogen Co., 31 North State St., Chicago, Ill.

—Time Study
Stein & Ellbogen Co., 31 North State St., Chicago, Ill.

WATCHMAN'S RECORDERS
Hardinge Bros. (Inc.), 1770 Berteau Ave., Chicago, Ill.
Newman Clock Co. (Inc.), 428-430 Broadway, New York, N. Y.
Simplex Time Recorder Co. ("Simplex"), Gardner, Mass.

WATER BACKS (Pressure)
*EDGE MOOR IRON CO., Edge Moor, Del. ..*p. 65*

WATER CIRCULATORS, FILTERS, GAGES, HEATERS, METERS, SPRAYS, ETC.
(See Circulators, Filters, Gages, Heaters, Meters, Sprays, Etc., Water)

WATER COLUMNS
AMERICAN STEAM GAUGE & VALVE MFG. CO., Boston, Mass...*pp. 200, 201*
*CRANE CO., 836 S. Michigan Ave., Chicago, Ill...*pp. 170, 171, 172, 173*
KELLY & JONES CO., Greensburg, Pa. ...*pp. 182, 183*
*LUNKENHEIMER CO. ("Vigilant"), Cincinnati, Ohio...*pp. 184, 185, 186, 187, 188, 189*

—Alarm
Chicago Automatic Switch Co., 212 N. Peoria St., Chicago, Ill.
Engineering Co. of Philadelphia, Harrison Bldg., Philadelphia, Pa.
Hills-McCanna Co., 2025 Elston Ave., Chicago, Ill.
*KIELEY & MUELLER (Inc.) ("Kieley"), 34 W. 13th St., New York, N. Y...*p. 212*
Plouff Co., 1500 River St., Boston, Mass.
Reliance Gauge Column Co. ("Reliance"), 5902 Carnegie Ave., Cleveland, Ohio
Roberts Steam Specialty Co. (The), 5318 St. Clair Ave., Cleveland, Ohio
Steigert, L. Co., N. E. Cor. Elder & Sogan Sts., Cincinnati, Ohio
Williams Gauge Co., 543 Fourth Ave., Pittsburgh, Pa.

WATER COOLING APPLIANCES
*COOLING TOWER CO., 15 John St., New York N. Y...*p. 165*
*WHEELER CONDENSER & ENGRG. CO., Carteret, N. J...*p. 162*

WATER DEAERATORS
*H. S. B. W.-COCHRANE CORPN., Philadelphia, Pa...*pp. 146, 147*

WATER PROOFING MATERIALS
Barrett Co., 40 Rector St., New York, N. Y.
*JOHNS-MANVILLE (Inc.), New York, N. Y...*p. 244*
Master Builders Co., 1836 Euclid Ave., Cleveland, Ohio
Sonneborn, L. Sons (Inc.), 264 Pearl St., New York, N. Y.
Toch Brothers, 320 Fifth Ave., New York, N. Y.
Trus-Con Laboratories, Cor. Caniff & G. T. R. R., Detroit, Mich.
Warner Quinlan Co., 79 Wall St., New York, N. Y.

WATER PURIFYING PLANTS
Chemo-Mechanical Water Improvement Co., Bulletin Bldg., Philadelphia, Pa.
Detroit Steam Appliance Co., 500 Union Trust Bldg., Detroit, Mich.
DODGE SALES & ENGINEERING CO., Mishawaka, Ind...*pp. 42, 43, 326, 327, 328, 329*
*H. S. B. W.-COCHRANE CORP'N., Philadelphia, Pa...*pp. 146, 147*
Hygeia Filter Co., 338 Denton Ave., Detroit, Mich.
BARTLETT, C. O. & SNOW CO., Cleveland, Ohio..*p. 367*
Excavating & Screening Machinery Co., 743 Security Bldg., Minneapolis, Minn.
International Filter Co., 40 S. Dearborn St., Chicago, Ill.
Jewell Polar Co. ("Polarstill"), 567 W. Van Buren St., Chicago, Ill.
LOOMIS-MANNING FILTER DISTRIBUTING CO., 1439 S. 37th St., Philadelphia, Pa...*p 110*
New York Continental Jewell Filtration Co., East Center St., Nutley, N. J.
Power Plant Specialty Co. (Vater), 1306 Monadnock Block, Chicago, Ill.
Roberts Filter Mfg. Co., 6th & Columbia Aves., Darby, Pa.
*SCAIFE, WM. B. & SONS CO. ("WE-FU-GO" and "Scaife"), Oakmont, Pa...*pp. 143, 660*

—Ozone
Electric Water Sterilizer & Ozone Co., Scottdale, Pa.

—Ultra Violet Ray
R. U. V. Co. (Inc.), 165 Broadway, New York, N. Y.

Digitized by Google

WATER SOFTENERS
American Water Softener Co. ("Zeolite"), Lehigh Ave. at Fourth St., Philadelphia, Pa.
Bird-Archer Co., 90 West St., New York, N. Y.
Borromite Co. of America ("Zeolite"), 105 West Monroe St., Chicago, Ill.
*BRAUN, C. F. & CO., San Francisco, Cal. ..*pp. 156, 157*
Chemo-Mechanical Water Improvement Co., Bulletin Bldg., Philadelphia, Pa.
Detroit Steam Appliance Co., 500 Union Trust Bldg., Detroit, Mich.
DODGE SALES & ENGINEERING CO. ("Eureka"), Mishawaka, Ind...*pp. 42, 43, 326, 327, 328, 329*
Graver Corp'n., 283 Jackson Blvd., East Chicago, Ind.
*H. S. B. W.-COCHRANE CORP'N ("Sorge-Cochrane"), Philadelphia, Pa...*pp. 146, 147*
Internatianal Boiler Compound Co., 140-42 W. Austin Ave., Chicago, Ill.
International Filter Co., 40 S. Dearborn St., Chicago, Ill.
Lake Erie Mfg. Co. (Inc.), 192-198 Chicago St., Buffalo, N. Y.
Moore Oil Co., York St. & McLean Ave., Cincinnati,Ohio
Northern Water Softener Co., 2305 Fair Oakes Ave., Madison, Wis.
*PERMUTIT CO. ("Permutit"), 440 Fourth Ave., New York, N. Y...*p. 141*
Power Plant Specialty Co. ("Vater"), 1306 Monadnock Block, Chicago, Ill.
REFINITE CO., Refinite Bldg., Omaha, Neb., ..*p. 142*
Reisert Automatic Water Purifying Co., 23 E. 26th St., New York, N. Y.
Richmond Water Softener Co., Richmond, Ind.
Roberts Filter Mfg. Co., 6th & Columbia Aves., Darby, Pa.
Russell-Kinkaid, 2729-31 Quinn St., Chicago, Ill.
*SCAIFE, WM. B. & SONS CO. (WE-FU-GO" and "Scaife"), Oakmont, Pa...*pp. 143, 660*

WATER STERILIZERS
Electric Water Sterilizer & Ozone Co., Scottdale Pa.
R. U. V. Co. (Inc.), 165 Broadway, New York, N. Y.

WATER SUPPLY SYSTEMS
Dayton Pump & Mfg. Co., 5th & Northwood Sts., Dayton, Ohio
DEMING CO., SALEM, OHIO..*p. 567*
Douglas, W. & B. Middletown, Conn.
ECONOMY PUMPING MACHINERY CO., 104-118 No. Curtis St., Chicago, Ill...*p. 568*
Latta-Martin Pump Co. ('Universal"), Hickory, N. C.
Rider-Ericson Engine Co., 20 Murray St., New York, N. Y.
*SCAIFE, WM. B. & SONS CO. ("WE-FU-GO" and "Scaife"), Oakmont, Pa...*pp. 143, 660*
Standard Pump & Engine Co., Akron, Ohio
Thompson Mfg. Co., Des Moines, Iowa

WATER TUBE BOILERS
(See Boilers, Water Tube)

WATER WHEELS
(See Turbines, Hydraulic)

WATERWORKS SUPPLIES
CLOW, JAMES B. & SONS, 534 So Franklin St., Chicago, Ill...*p. 230, 231*
Keystone-Hindley Gear Co., 20th St. & Indiana Ave., Philadelphia, Pa.
Pitometer Co., 25 Elm St., New York, N. Y.
*U. S. CAST IRON PIPE & FOUNDRY CO., Burlington, N. J...*pp. 232, 233*
Walker Mfg. Co., Fenton, Mich.
WOOD, R. D. & CO., Philadelphia, Pa...*p. 597*

WATT-HOUR METERS
(See Meters, Watt-Hour)

WATTMETERS
*BRISTOL CO., Waterbury Conn...*p. 291*
Esterline-Angus Co., Indianapolis, Ind.
*WESTINGHOUSE ELECTRIC & MFG. CO., East Pittsburgh, Pa...*pp. 160, 161*

WEBBING
Empire Mfg. Co., 97 Spring St., Lockport, N. Y.
Lambeth Rope Corp'n., New Bedford, Mass.

WEDGES (Drop Forged)
STANDARD SHOP EQUIPMENT CO., 23rd St. & Hunting Park Ave., Philadelphia, Pa...*p. 515*

WEIGH BASKETS (Coal)
Fairmont Mining Machinery Co., Fairmont, W. Va.

WEIGHERS
—Conveying
CONVEYING WEIGHER CO., 90 West St., New York, N. Y...*p. 371*
—Water
FAIRBANKS, MORSE CO., 900 S. Wabash Ave., Chicago, Ill...*p. 41*
Richardson Scale Co., Passaic, N. J.
WILLCOX ENGINEERING CO., Saginaw, Mich...*pp. 272, 613*
*YARNALL-WARING CO. ("Yarway"), 7603-20 Queen St., Chestnut Hill, Philadelphia, Pa...*p. 196*

WEIGHING MACHINERY (Automatic)
American Kron Scale Co., 430 E. 53rd St., New York, N. Y.
Computing Scale Co., Dayton, Ohio
DU VIVIER, ERNEST H., 30 Church St., New York, N. Y...*p. 270*
Electric Weighing Co., 182 Thirteenth Ave., New York, N. Y.
Fairbanks, E. T. & Co., St. Johnsburg, Vt.
FAIRBANKS, MORSE & CO., 900 S. Wabash Ave., Chicago, Ill...*p. 41*
National Packaging Machinery Co., 174 Green St., Jamaica Plain, Boston, Mass.
RELIANCE WEIGHING MACHINE DIVISION, Stearns Motor Mfg. Co., Ludington, Mich...*p. 271*
Richardson Scale Co., Passaic, N. J.
Simmons, John Co., 104-110 Center St., New York, N. Y.
Streeter-Amet Weighing & Recording Co., 4101-05 Ravenswood Ave., Chicago, Ill.

WEIGHT RECORDING ATTACHMENTS
Streeter-Amet Weighing & Recording Co., 4101-05 Ravenswood Ave., Chicago, Ill.

WEIGHTS
—Laboratory
Torsion Balance Co., 92 Reade St., New York, N. Y.
—Sash
Boshworth Ard Mach. & Fdry. Co., Anniston, Ala.

WELDING
—Chemical Reaction
Metal & Thermit Corp'n ("Thermit"), 120 Broadway, New York, N. Y.
—Electric
CONNERY & CO. (Inc.), 2nd and Luzerne Sts., Philadelphia, Pa...*p. 651*
E. C. Manufacturing Co., 546-648 W. Harrison St., Chicago, Ill.

Digitized by Google

Lawrence, L. & Co., 290 Halsey St., Newark, N. J.
LEBANON BOILER WORKS (J. K. Petty & Co., Inc.), 6 So. 15th St., Philadelphia, Pa...*pp. 78, 79*
Metals Welding Co., 4400 Perkins Ave., Cleveland, Ohio
Pipe Coiling, Bending & Welding Co., Grant Ave. & B. & O. R. R., Sharpsburgh, Pa.
QUASI-ARC WELDTRODE CO. (Inc.), 114 Hudson Ave., Peekskill, N. Y...*p. 538*
Rochester Welding Works, 349 Orchard St., Rochester, N. Y.
Standard Parts Co., E. 11 & Walunt Sts., Cleveland, Ohio
Thompson Electric Welding & Thompson Spot Welder Co., 161 Pleasant St., Lynn, Mass.
Universal Electrical Welding Co., Webster Ave. & Hancock St., Long Island City, N. Y.
WILSON WELDER & METALS CO. (Inc.), 259 36th St., Brooklyn, N. Y...*p. 537*
WILLIAMS, J. H. & CO., 70 Richards St., Brooklyn, N. Y...*p. 517*
Winfield Electric Welding Machine Co., 12 Atlantic St., Warren, Ohio

—Hammer Forge

Blaw-Knox Co., P. O. Box 915, Pittsburgh, Pa.

—Oxy-Acetylene

HONHORST, JOS. CO., 1016-20 W. 6th St., Cincinnati, Ohio...*p. 654*
LEBANON BOILER WORKS, (J. K. Petty & Co., Inc.), 6 So. 15th St., Philadelphia, Pa...*pp. 78, 79*
Metals Welding Co., 4400 Perkins Ave., Cleveland, Ohio
Wildex Co., Richmond, Ind.

—Spot

*PITTSBURGH VALVE FOUNDRY & CONSTRUCTION CO., P. O. Box 1016, Pittsburgh, Pa...*pp. 192, 193*
Universal Electrical Welding Co., Webster Ave. & Hancock St., Long Island City, N. Y.

WELDING AND BRAZING

American Tube Bending Co., 5-7-9 Lawrence St., New Haven, Conn.

WELDING AND CUTTING APPARATUS

QUASI-ARC WELDTRODE CO. (Inc.), 114 Hudson Ave., Peekskill, N. Y...*p. 538*
WILSON WELDER & METALS CO. (Inc.), 259 36th St., Brooklyn, N. Y...*p. 537*

—Oxy-Acetylene, Etc.

Air Reduction Co. (Inc.), 342 Madison Ave., New York, N. Y.
BASTIAN-BLESSING CO. ("Rego"), 125 W. Austin Ave., Chicago, Ill...*p. 539*
Burdett Mfg. Co., 309 St. Johns Court, Chicago Ill
Carbo-Hydrogen Co. of America, Benedum-Trees Bldg., Pittsburgh, Pa.
Cave Welding & Mfg. Co., 32 Liberty St., Springfield, Mass.
Cox Brass Mfg. Co., Albany, N. Y.
Davis-Bournonville Co., Jersey City, N. J.
Dyer, G. H. Co., 155 Brookline St., Cambridge, Mass.
Economy Welding Machine Co., S. W. Blvd. & Central, Kansas City, Mo.
ELECTROLABS CO., Pittsburgh, Pa...*p. 536*
General Welding Co., 355 14th St., Hoboken, N. J.
General Welding & Equipment Co., 107 Mass. Ave., Boston, Mass.
Henderson-Willis Welding & Cutting Co., 2305-07-09 N. 11th St., St. Louis, Mo.
Imperial Brass Mfg. Co. ("Imperial"), 1200 W. Harrison St., Chicago, Ill.
K-G Welding & Cutting Co., 556 W. 34th St., New York, N. Y.
Messer Welding Supply Co., 113 Eleventh St., Brooklyn, N. Y.
Metals Welding Co., 4400 Perkins Ave., Cleveland, Ohio
MILBURN, ALEXANDER CO. (The), Baltimore, Md...*p. 540*
Oxweld Acetylene Co., 30 E. 42nd St., New York N. Y.
Oxy-Carbi Co., New Haven, Conn.
SMITH'S INVENTIONS, (Inc.), 2636 4th St., S. E., Minneapolis, Minn...*p. 541*
Thermaiene Co., Chicago Heights, Ill.
Waterhouse Welding Co., 15 Pelham St., Boston, Mass.
Weldcraft Equipment Co., 2501 Penn Ave., Pittsburgh, Pa.
Welding Supply Co. (Inc.), 132 Nassau St., New York, N. Y.

WELDING AND CUTTING WORK

Cave Welding & Mfg. Co. ("Rego"), 32 Liberty St., Springfield, Mass.
K-G Welding & Cutting Co. (Inc.), 556 W. 34th St., New York, N. Y.
The Metals Welding Co., 4400 Perkins Ave., Cleveland, Ohio
NEWBURGH STEAM BOILER WORKS, (P. Delany & Co.), Newburgh, N. Y...*p. 64*
Riddell Bros. (Inc.), 340 Whitehall St., Atlanta, Ga.
Rochester Welding Works, 349 Orchard St., Rochester, N. Y.
Taylor Welder Co., Warren, Ohio
WILSON WELDER & METALS CO. (Inc.), 259 36th St., Brooklyn, N. Y...*p. 537*

WELDING MACHINES, ELECTRIC

Electric Arc Cutting & Welding Co. ("Alternarc"), 152-158 Jelliff Ave., Newark, N. J.
Eveland Electric Riveter Co., West End Trust Bldg., Philadelphia, Pa.
Federal Machine & Welder Co., Dana Ave., Warren, Ohio
Gibb Instrument Co., 348 Palmer Ave., E., Detroit, Mich.
Thomson Electric Welding & Thomson Spot Welder Co., 161 Pleasant St., Lynn, Mass.
Universal Electrical Welding Co., Webster Ave. & Hancock St., Long Island City, N. Y.
*WESTINGHOUSE ELECTRIC & MFG. CO., East Pittsburgh, Pa...*pp. 160, 161*
Winfield Electric Welding Machine Co., 12 Atlantic St., Warren, Ohio

—Arc Method

Burke Electric Co., Erie, Pa.
*GENERAL ELECTRIC CO., Schenectady, N. Y...*pp. 18, 19, 20, 21*
Lincoln Electric Co., Kelly Ave. & 38th St., Cleveland, Ohio
QUASI-ARC WELDTRODE CO. (Inc.), 114 Hudson Ave., Peekskill, N. Y...*p. 538*
U. S. Light & Heat Corpn. ("USY"), Niagara Falls, N. Y.
WILSON WELDER & METALS CO. (Inc.), 259 36th St., Brooklyn, N. Y...*p. 537*

WELDING SUPPLIES

Electric Arc Cutting & Welding Co. ("New-arc"), 152-158 Jelliff Ave., Newark, N. J.
Gibb Instrument Co., 348 Palmer Ave., E., Detroit, Mich.
Henderson-Willis Welding & Cutting Co., 2305-07-09 N. 11th St., St. Louis, Mo.
Oxweld Acetylene Co., 30 E. 42nd St., New York, N. Y.
QUASI-ARC WELDTRODE CO. (Inc.), 114 Hudson St., Peekskill, N. Y...*p. 538*

We

Digitized by Google

WELDING SUPPLIES (Continued)
SMITH'S INVENTIONS, (Inc.), 2636 4th St., S. E., Minneapolis, Minn...*p. 541*
Thermalene Co., Chicago Heights, Ill.
Welding Supplies Co. (Inc.), 182 Nassau St., New York, N. Y.
WILSON WELDER & METALS CO. (Inc.), 259 36th St., Brooklyn, N. Y...*p. 537*

WELL-DRILLING MACHINERY
Keystone Driller Co., Beaver Falls, Pa.
NATIONAL SUPPLY CO. (The), Toledo, O. ..*pp. 648, 649*

WELL SUPPLIES
COOK, A. D. (Inc.), Lawrenceburg, Ind. *p. 585*
Mark Manufacturing Co., 2111 Conway Bldg., Chicago, Ill.

WHEATSTONE BRIDGES
Thompson-Levering Co., 325 Arch St., Philadelphia, Pa.

WHEELS
—Canvas Cushion
Divine Bros. Co., Utica, N. Y.
—Car
American Car & Foundry Co., 165 Broadway, New York, N. Y.
BASS FOUNDRY & MACHINE CO., Fort Wayne, Ind...*p. 57*
Chrisman Foundry Co., Morgantown, W. Va.
Disteel Wheel Corp'n ("Disteel"), 4815 Cabot Ave., Detroit, Mich.
Engine & Machinery Co., Marion Ave. & Navarre Rd., S. W., Canton, Ohio
FAIRBANKS, MORSE & CO., 900 S. Wabash Ave., Chicago, Ill...*p. 41*
*FULLER LEHIGH CO., Fullerton, Pa...*p. 128*
Koppel Industrial Car & Equipment Co., Koppel, Beaver Co., Pa.
Lobdell Car Wheel Co., P. O. Box 965, Wilmington, Del.
Mt. Vernon Car Mfg. Co., Mt. Vernon, Ill.
Railway Steel Spring Co., 30 Church St., New York, N. Y.
Sanford-Day Iron Works, Knoxville, Tenn.
—Disc
Disteel Wheel Corp'n ("Disteel"), 4815 Cabot Ave., Detroit, Mich.
Indestructible Wheel Co., Lebanon, Ind.
—Fibre
DIAMOND STATE FIBRE CO., Bridgeport, Pa...*p. 420*
—Mine Car
AMERICAN PULLEY CO., 4200 Wissahickon Ave., Philadelphia, Pa...*p. 322*
Blakeslee Mfg. Co., Du Quoin, Ill.
Brownsville Foundry & Machine Co., South Brownsville, Pa.
FAIRBANKS, MORSE CO., 900 S. Wabash Ave., Chicago, Ill...*p. 41*
*FULLER-LEHIGH CO., Fullerton, Pa...*p. 128*
Lobdell Car Wheel Co., P. O. Box 965, Wilmington, Del.
WELLER MFG. CO., 1820-1856 N. Kostner Ave., Chicago, Ill...*p. 381*
—Pressed Steel
Detroit Pressed Steel Co., 6660 Mt. Elliot Ave., Detroit, Mich.
FAIRBANKS, MORSE & CO., 900 S. Wabash Ave., Chicago, Ill...*p. 41*
—Roller Bearing
Blakeslee Mfg. Co., Du Quoin, Ill.
Hockensmith Wheel & Mine Car Co., Penn Station, Pa.
—Steel (Agricultural Implements)
Little, J. R. Metal Wheel Co., Front & Cedar Sts., Quincy, Ill.
—Steel (Concrete Machinery)
Little, J. R. Metal Wheel Co., Front & Cedar Sts., Quincy, Ill.
—Steel (Motor Truck)
Disteel Wheel Corp'n ("Disteel"), 4815 Cabot Ave., Detroit, Mich.
Indestructible Wheel Co., Lebanon, Ind.
Little, J. R. Metal Wheel Co., Front & Cedar Sts., Quincy, Ill.
Massillon Steel Casting Co., Massillon, Ohio
—Steel, Rolled
Divine Bros. Co., Utica, N. Y.
Edgewater Steel Co., Farmers Bank Bldg., Pittsburgh, Pa.
Standard Steel Works Co., 500 No. Broad St., Philadelphia, Pa.
—Tractor
Whitehead & Kales Iron Works, Beecher Ave. & M. C. R. R., Detroit, Mich.
—Trolley
*FULLER-LEHIGH CO., Fullerton, Pa...*p. 128*
—Wire (Automobile)
STANDARD STEEL & BEARINGS (Inc.), ("Rudge-Whitworth"), 366 Madison Ave., New York, N. Y...*p. 354*

WHISTLES
—Air
WESTINGHOUSE TRACTION BRAKE CO., Wilmerding, Pa...*pp. 550, 551*
—Steam
AMERICAN STEAM GAUGE & VALVE MFG. CO., Boston, Mass...*pp. 200, 201*
*ASHTON VALVE CO., 161 First St., Cambridge, Boston, Mass...*p. 287*
*CRANE CO., 836 S. Michigan Ave., Chicago, Ill...*pp. 170, 171, 172, 173*
*CROSBY STEAM GAGE & VALVE CO., 40 Central St., Boston, Mass...*p. 202, 208*
KELLY & JONES CO., Greensburg, Pa...*pp. 182, 183*
LONERGAN, J. E. CO., 211-215 Race St., Philadelphia, Pa...*pp. 203, 289*
*LUNKENHEIMER CO. ("Mockingbird"), ("Tritone"), Cincinnati, Ohio...*pp. 184, 185, 186, 187, 188, 189*
UNION WATER METER CO., Worcester, Mass...*p. 276*

WHITE LEAD
National Lead Co. ("Dutch Boy"), 111 Broadway, New York, N. Y.

WHITE METALS
(See Metals, White)

WINCHES
—Auto Truck
Bay City Foundry & Machine Co., 26th & Water Sts., Bay City, Mich.
—Contractor's
AMERICAN HOIST & DERRICK CO., St. Paul, Minn...*p. 383*
Fairbanks Steam Shovel Co., Marion, Ohio
*LIDGERWOOD MFG. CO., 96 Liberty St., New York, N. Y...*p. 388*
Round, D., & Sons, Cleveland, Ohio
—Electric
BOX, ALFRED & CO. (Inc.), Philadelphia, Pa...*p. 394*
Flory, S. Mfg. Co., Bangor, Me.
Gilbert-Grant Co. (Inc.), Grand Central Terminal, New York, N. Y.
MARIS BROS. (Inc.), 5546 Grays Ave., Philadelphia, Pa...*p. 395*
*SHEPARD ELECTRIC CRANE & HOIST CO., Montour Falls, N. Y...*pp. 400, 401*
—Hand Power
Horton, John T. Co., 242 Bradhurst Ave., New York, N. Y.

Digitized by Google

*LIDGERWOOD MFG. CO., 96 Liberty St., New York, N. Y...*p. 388*

—Pneumatic
CHICAGO PNEUMATIC TOOL CO. ("Little Giant"), 6 E. 44th St., New York, N. Y. *p. 548*

—Ship
AMERICAN HOIST & DERRICK CO., St. Paul, Minn...*p. 426*
Dake Engine Co., Grand Haven, Mich.
Flory, S. Mfg. Co., Bangor, Pa.
*LIDGERWOOD MFG. CO., 96 Liberty St., New York, N. Y...*p. 388*
*SHEPARD ELECTRIC CRANE & HOIST CO., Montour Falls, N. Y...*pp. 400, 401*

—Truck
Erie Hoist Co., 2101 Holland St., Erie, Pa.
Wunsch & Washburn, Stone Ave. & McDougal St., Brooklyn, N. Y.

WINDING MACHINES
Cameron Machine Co., 61 Poplar St., Brooklyn, N. Y.
The Kruger & Blind Co., 513 Master St., Philadelphia, Pa.
Universal Winding Co., Boston, Mass.

—Electric
American Electric Fusion Corp'n, 1906 North Halsted St., Chicago, Ill.

WINDLASSES
Mundy, J. S. Hoisting Engine Co., 722 Frelinghuysen Ave., New York, N. Y.

WIRE

—All Metals (In Fine Gauges)
AMERICAN BRASS CO., Waterbury, Conn. *p. 414*
Michigan Wire Cloth Co., 536 Howard St., Detroit, Mich.
*ROEBLING'S, JOHN A., SONS CO., Trenton, N. J...*p. 409*

—Aluminum
Aluminum Company of America, Pittsburgh, Pa.

—Annealed
*ROEBLING'S, JOHN A. SONS CO., Trenton, N. J...*p. 409*

—Brass and Copper
AMERICAN BRASS CO., Waterbury, Conn. *p. 414*
*ROEBLING'S, JOHN A., SONS CO., Trenton, N. J...*p. 409*

—Copper, Rubber Insulated
*GENERAL ELECTRI CCO., Schenectady, N. Y...*pp. 18, 19, 20, 21*
Hazard Mfg. Co., Wilkes Barre, Pa.

—Fence
Wickwire Spencer Steel Corp'n, Worcester, Mass.

—Flat
BARNES, WALLACE CO., Bristol, Conn...*p. 519*
Prentiss, Geo. W. & Co., Holyoke, Mass.
*ROEBLING'S, JOHN A., SONS CO., Trenton, N. J...*p. 409*

—Iron and Steel
Atlantic Steel Co., Atlanta, Ga.
Pittsburgh Steel Co., Union Arcade Bldg., Pittsburgh, Pa.
Prentiss, Geo. W., & Co., Holyoke, Mass.
*ROEBLING'S, JOHN A., SONS CO., Trenton, N. J...*p. 409*
United States Steel Products Co., 4th Ave., & Connecticut St., Seattle, Wash.
Wickwire Spencer Steel Corp'n, Worcester, Mass.

—Monel Metal
AMERICAN BRASS CO., Waterbury, Conn. *p. 414*
Supplee-Biddle Hardware Co., 512 Commerce St., Philadelphia, Pa.

—Nickel
Haring, Ellsworth, 114 Liberty St., New York, N. Y.

—Nickel Silver
AMERICAN BRASS CO., Waterbury, Conn. *p. 414*

—Screen
New Jersey Wire Cloth Co., Trenton, N. J.

—Spring
BARNES, WALLACE CO., Bristol, Conn...*p. 519*
Haring Ellsworth, 114-118 Liberty St., New York, N. Y.
Kidd Drawn Steel Co., Aliquippa, Pa.
New York Wire & Spring Co., Hoboken, N. J.
*ROEBLING'S, JOHN A., SONS CO., Trenton, N. J...*p. 409*

—Steel
Bridgeport Screw Co., P. O. Box 1014 Bridgeport, Conn.
*ROEBLING'S, JOHN A., SONS CO., Trenton, N. J...*p. 409*
Wheelock, Lovejoy & Co., 128 Sidney St., Cambridge, Mass.

—Streamline (Airplane)
Macwhyte Co., Kenosha, Wis.
*ROEBLING'S, JOHN A., SONS CO., Trenton, N. J...*p. 409*

—Welding
Apex Steel Corp'n, 50 Church St., New York, N. Y.
Central Steel & Wire Co., 119 N. Peoria St., Chicago, Ill.
Federal Tool & Alloy Steel Corp'n, 62-76 Rutledge St., Brooklyn, N. Y.
Philadelphia Steel & Iron Co., 1008 Commercial Trust Bldg., Philadelphia, Pa.
Prentiss, Geo. W. & Co., Holyoke, Mass.
QUASI-ARC WELDTRODE CO. (Inc.), 114 Hudson Ave., Peekskill, N. Y...*p. 538*
*ROEBLING'S, JOHN A., SONS CO., Trenton, N. J...*p. 409*
WILSON WELDER & METALS CO. (Inc.), 259 36th St., Brooklyn; N. Y...*p. 537*

WIRE AND CABLES (Electrical)
AMERICAN BRASS CO., Waterbury, Conn. *p. 414*
American Steel & Wire Co., 72 W. Adams St., Chicago, Ill.
*GENERAL ELECTRIC CO., Schenectady, N. Y...*pp. 18, 19, 20, 21*
Hazard Mfg. Co., Wilkes-Barre, Pa.
NEW ENGLAND BUTT CO., Providence, R. I...*p. 639*
*ROEBLING'S, JOHN A., SONS CO., Trenton, N. J...*p. 409*
United States Steel Products Co., 4th Ave. & Connecticut St., Seattle, Wash.
Western Electric Co. (The), 195 Broadway, New York, N. Y.
WILSON WELDER & METALS CO, (Inc.), 259 36th St., Brooklyn, N. Y...*p. 537*

WIRE BUNCHING MACHINERY
AMERICAN INSULATING MACHINERY CO., Philadelphia, Pa...*p. 638*

WIRE CARDS
Rogers Wire Works, (Inc.), 291 Broadway, New York, N. Y.

WIRE CLOTH
(See Cloth, Wire)

WIRE DRAWING MACHINERY
AMERICAN INSULATING MACHINERY CO., Philadelphia, Pa...*p. 638*

Digitized by Google

WIRE DRAWING MACHINERY (Continued)
Morgan Construction Co., Worcester, Mass.
NEW ENGLAND WIRE MACHINERY CO., New Haven, Conn...*p. 640*
Richard Mfg. Co., Bloomsburg, Pa.
Standard Machinery Co., Auburn, R. I.
TORRINGTON MFG. CO., Torrington, Conn. *p. 641*
Vaughn Machinery Co., Cuyahoga Falls, Ohio
—Tungsten
Langelier Mfg. Co., 51 Washington Ave., Arlington, Cranston, R. I.

WIRE ENAMELING MACHINERY
AMERICAN INSULATING MACHINERY CO., Philadelphia, Pa...*p. 638*

WIRE FORMING MACHINES
Atlas Machine Co., 140 Manhan St., Waterbury, Conn.
Baird Machine Co., Bridgeport, Conn.
*BLISS, E. W., CO., Brooklyn, N. Y...*pp. 438, 439*
Cobden Machine Works, Cobden, Ill.
Manville, E. J. Machine Co., Waterbury, Conn.
Nilson, A. H. Machine Co., 1525 Railroad Ave., Bridgeport, Conn.
Sleeper & Hartley, (Inc.), Worcester, Mass.
Smurr & Kamen Co., 328 No. Albany Ave., Chicago, Ill.

WIRE INSULATING MACHINERY
(See also Insulating Machinery)
AMERICAN INSULATING MACHINERY Co., Philadelphia, Pa...*p. 638*
NEW ENGLAND WIRE MACHINERY CO., New Haven, Conn...*p. 640*

WIRE MEASURING MACHINERY
AMERICAN INSULATING MACHINERY CO., Philadelphia, Pa...*p. 638*

WIRE MECHANISM (Lever Control)
*GWILLIAM CO. ("Bowden"), 23 Flatbush Ave., Brooklyn, N. Y...*pp. 356, 357, 358*

WIRE MILL MACHINERY
Brown Engine Co., Fitchburg, Mass.
TORRINGTON MFG. CO., Torrington, Conn. *p. 641*

WIRE NAIL MACHINERY
National Machinery Co., Tiffin, Ohio
Perkins, Henry Co., Bridgewater, Mass.

WIRE RECLAIMING MACHINERY
AMERICAN INSULATING MACHINERY CO., Philadelphia, Pa...*p. 638*

WIRE RESPOOLING MACHINES
AMERICAN INSULATING MACHINERY CO., Philadelphia, Pa...*p. 638*

WIRE ROPE
(See Rope, Wire)

WIRE ROPE FASTENINGS
AMERICAN HOIST & DERRICK CO. ("Crosby"), St. Paul, Minn...*p. 383*
Broderick & Bascom Rope Co., 76 Warren St., New York, N. Y.
Chicago Steel Foundry Co., 3720 S. Kedzie Ave., Chicago, Ill.
Hazard Mfg. Co., Wilkes-Barre, Pa.
Moon, George C. Co. (Inc.), Garwood, N. J.
*ROEBLING'S, JOHN A., SONS CO., Trenton, N. J...*p. 409*
J. H. WILLIAMS & CO., 70 Richards St., Brooklyn, N. Y...*p. 517*
Williamsport Wire Rope Co., Williamsport, Pa.

WIRE ROPE MACHINES
NEW ENGLAND BUTT CO., Providence, R. I...*p. 639*
NEW ENGLAND WIRE MACHINERY CO., New Haven, Conn...*p. 640*

WIRE SPECIALTIES
Brigeport Chain Co., 964 Crescent Ave., Bridgeport, Conn.
Cuyahoga Spring Co., Waterloo Rd., Cleveland, Ohio
Eastern Tool & Mfg. Co., Bloomfield, N. J.
Gem Stopper Co., 2120 Nicholas St., Philadelphia, Pa.
Interstate Iron & Steel Co., 104 S. Michigan Ave., Chicago, Ill.
*ROEBLING'S, JOHN A., SONS CO., Trenton, N. J...*p. 409*

WIRE STRAIGHTENING AND CUTTING MACHINERY
Nilson, A. H. Mach. Co., 1525 Railroad Ave., Bridgeport, Conn.
Shuster, F. B. Co., New Haven, Conn.

WIRE STRANDING MACHINERY
AMERICAN INSULATING MACHINERY CO., Philadelphia, Pa...*p. 638*
NEW ENGLAND WIRE MACHINERY CO., New Haven, Conn...*p. 640*

WIRE TAPING MACHINES
AMERICAN INSULATING MACHINERY CO., Philadelphia, Pa...*p. 638*

WIRE TESTING MACHINES
OLSEN, TINIUS TESTING MACHINE CO., 500 N. 12th St., Philadelphia, Pa...*pp. 265, 266, 267*
RIEHLE BROS. TESTING MACHINE CO., 1424 N. 9th St., Philadelphia, Pa...*p. 268*

WIRE TINNING EQUIPMENT
NEW ENGLAND WIRE MACHINERY CO., New Haven, Conn...*p. 640*

WIRE WORK
Eastern Tool & Mfg. Co., Bloomfield, N. J.
Howard & Morse, 45 Fulton St., New York, N. Y.
Morse & Whyte Co., Sidney & Pilgrim Sts., Cambridge, Mass.
New Jersey Wire Cloth Co., Trenton, N. J.

WIRING DEVICES
Benjamin Electric Mfg. Co., 806 W. Washington Blvd., Chicago, Ill.
Carleton-Mace Engine Corpn., 18 Tremont St., Boston, Mass.
Electric Co., 94 Allyn St., Hartford, Conn.
*GENERAL ELECTRIC CO., Schenectady, N. Y...*pp. 18, 19, 20, 21*

WOOD PRODUCTS
Rutland Mfg. Co. (Inc.), Forest, West & Pine Sts., Rutland, Vt.

WOOD SCREW MACHINERY
Cook, Asa S. Co., Hartford, Conn.
Townsend, H. P. Mfg. Co., Hartford, Conn.

WOOD WORKING MACHINERY
Corinth Machinery Co., Corinth, Miss.
Cowdrey, C. H., Machine Works, 20 Main St., Fitchburg, Mass.
Crescent Machine Co., Leetonia, Ohio
Emmert Mfg. Co., Waynesboro, Pa.
Fay, J. A. & Egan Co., Cincinnati, Ohio
Garland, M. Co., Bay City, Mich.
Greenlee Bros. & Co., Rockford, Ill.
Hermance Machine Co., Williamsport, Pa.
Holmes, E. & B. Machinery Co., 58 Chicago St., Buffalo, N. Y.
Jenkins Machine Co., Sheboygan, Wis.
*JONES, W. A. FOUNDRY & MACHINE CO., 4415 W. Roosevelt Rd., Chicago, Ill. *pp. 312, 313, 314, 315*
Klotz Machine Co., 318 W. Water St., Sandusky, Ohio

Digitized by Google

Mattison Machine Works, Rockford, Ill.
NEW BRITAIN MACHINE CO., New Britain, Conn...*p. 463*
Newman Machine Co., Jackson St. & So. Ry., Greensboro, N. C.
Oliver Machinery Co., Grand Rapids, Mich.
Olney & Warrin, 297-301 Lafayette St., New York, N. Y.
Osborne & Sexton Machinery Co., Columbus, Ohio
Pettingell Machinery Co., Amesbury, Mass.
Pryibil, P. Machine Co., 520 W. 41st St., New York, N. Y.
Root, B. N. Co., York, Pa.
Sidney Machine Tool Co., Sidney, Ohio
Silver Mfg. Co., Salem, Ohio
Sinker, Davis Co., 230 S. Missouri St., Indianapolis, Ind.
Valley City Machine Works, 12-16 Sampau Ave., Grand Rapids, Mich.
Wallace, J. D. & CO., 1401 W. Jackson Blvd., Chicago, Ill.
Whitney, Baxter D. & Son (Inc.), Winchendon, Mass.
Woods, S. A. Machine Co., Boston 27, Mass.
Yates, P. B. Machine Co., Beloit, Wis.

WOOLEN MANUFACTURING MACHINERY

Curtis & Marble Machine Co., 78 Cambridge St., Worcester, Mass.
DAVIS & FURBER MACHINE CO., North Andover, Mass...*p. 642*
Whitin Machine Works, Whitinsville, Mass.

WORK HOLDERS
(See Holders, Work)

WORK STANDS, PORTABLE
NEW BRITAIN MACHINE CO., New Britain, Conn...*p. 463*

WORM GEAR DRIVES

*CLEVELAND WORM & GEAR CO., Cleveland, Ohio...*p. 306*
General Machinery Mfg. Co., 920-22 N. Main St. St Louis, Mo.
Hindley Gear Co., 1105 Frankford Ave., Philadelphia, Pa.
*JONES, W. A FOUNDRY & MACHINE CO., 4415 Roosevelt Road, Chicago, Ill...*pp. 312, 313, 314, 315*

WORSTED MANUFACTURING MACHINERY

DAVIS & FURBER MACHINE CO., North Andover, Mass...*p. 642*
Saco-Lowell Shops, 77 Franklin St., Boston, Mass.

WRAPPING MACHINERY

Ferguson and Haas, 515 Greenwich St., New York, N. Y.
National Packaging Machinery Co., 174 Green St., Jamaica Plain, Boston, Mass.
Redington, B. F., Co., 114 S. Sangamon St, Chicago, Ill

WRENCH SETS (Socket Ratchet)

LOWELL WRENCH CO., 54 Commercial St., Worcester, Mass...*p. 516*

WRENCHES

Bonney Forge & Tool Works, Allentown, Pa.
*GREENE, TWEED & CO. ("Champion"), 109 Duane St., New York, N. Y...*p. 250*
Keystone Mfg Co. ("Westcott"), (Adj. "S"), 41-51 Chandler St., Buffalo, N. Y.
Kraeuter & Co. (Inc.), 585 18th Ave., Newark N. J.
LAKESIDE FORGE CO., Erie, Pa...*p. 294*
Lima Drill Press Co., 207 Holland Block, Lima, Ohio
Mossberg, Frank Co., Lamb Street, Attleboro, Mass.
*ROEBLING'S, JOHN A., SONS CO., Trenton, N. J...*p. 409*
WILLIAMS, J. H. & CO., 70 Richards St., Brooklyn, N. Y...*p. 517*

—Chain

*GREENE, TWEED & CO. ("Brock"), 109 Duane St., New York, N. Y...*p. 250*
KROESCHELL BROS. CO. ("Ideal"), 460 West Erie St., Chicago, Ill...*p. 75*
Robbins, Gamwell & Co., 68 West St., Pittsfield, Mass.
Trimont Mfg. Co., "Trimo", Roxbury, Boston, Mass.
WILLIAMS, J. H. & CO. ("Falcon"), ("Vulcan"), 70 Richards St., Brooklyn, N. Y...*p. 517*

—Drop-Forged

Armstrong Bros. Tool Co., 333 N. Francisco Ave., Chicago, Ill.
WILLIAMS, J. H. & CO., 70 Richards St., Brooklyn, N. Y...*p. 517*
LAKESIDE FORGE CO., Erie, Pa...*p. 429*

—Pipe

Greenfield Tap & Die Corpn. ("GTD"), Greenfield, Mass.
Moore Drop Forging Co. ("Stillson"), Springfield, Mass.
Trimont Mfg. Co. ("Trimo"), Roxbury, Boston, Mass.
Walworth Mfg. Co. ("Stillson"), First & O. Sts., South Boston, Mass.
WILLIAMS, J. H. & CO. ("Falcon," "Vulcan"), 70 Richards St., Brooklyn, N. Y...*p. 517*

—Monkey

Trimont Mfg. Co. ("Trimo"), Roxbury, Boston, Mass.
WILLIAMS, J. H. & CO., 70 Richards St., Brooklyn, N. Y...*p. 517*

—Ratchet

*GREENE, TWEED & CO. ("Favorite"), 109 Duane St., New York, N. Y...*p. 250*
Keystone Mfg. Co. ("Keystone"), 41-51 Chandler St., Buffalo, N. Y.
LOWELL WRENCH CO., 54 Commercial St., Worcester, Mass...*p. 516*
*STARRETT, L. S. CO., Anthol, Mass...*p. 508*

—Socket

LAKESIDE FORGE CO., Erie Pa...*p. 429*
LOWELL WRENCH CO., 54 Commercial St., Worcester, Mass...*p. 516*
WILLIAMS, J. H. & CO., 70 Richards St., Brooklyn, N. Y...*p. 517*

—Tap

Card, S. W. Mfg. Co., Rumford Ave., Mansfield, Mass.
Carpenter, J. M. Tap & Die Co., Pawtucket, R. I.
PRATT & WHITNEY CO., 111 Broadway, New York, N. Y...*p. 471*
*STARRETT, L. S. CO., Anthol, Mass...*p. 508*

Y

YARN DRESSING MACHINERY

FRANKLIN MACHINE CO., P. O. Address Box 1393, Providence, R. I...*p. 9*

Z

ZINC

Hazel Atlas Glass Co., Wheeling, W. Va.

—Electrolytic

U. S. Smelting Refining & Mining Co., 120 Broadway, New York, N. Y.

ZINC DUST

Merrill Co. ("Merrillite"), 121 Second St., San Francisco, Cal.

Zi

Digitized by Google

Digitized by Google

Consulting Engineers' Directory

IN this, its fifth issue as a reference feature of the volume of A. S. M. E. Condensed Catalogues, the Consulting Engineers' Directory shows a considerable gain in scope and comprehensiveness.

Continuing the policy of previous years the Directory is compiled from returns received from the members of The American Society of Mechanical Engineers. Such omissions as may be noted are due in most cases to failure on the part of members to furnish the information desired.

The arrangement of one listing free of charge and listing under additional headings at one dollar each is continued in this issue.

Every effort has been made to secure and include the names of the greatest possible number of consulting engineers with the result that in this volume the Directory contains the names and addresses of 1000 engineers listed under upward of 400 classifications.

DIRECTORY SECTION

PART II **Pages 901-932**

Digitized by Google

Digitized by Google

CONSULTING ENGINEER'S DIRECTORY

A

ABRASIVES
Brown, Henry A., 2768 Delaware Ave., Buffalo, N. Y.

ABSORPTION APPARATUS
Steere Engineering Co., Woodward & Horton Aves., Detroit, Mich.

ADVERTISING
(See also Publicity)
Gibson, Geo. H. Co., 100 Gold St., New York, N. Y.
Hirschberg, Charles Austin (Inc.), 150 Nassau St., New York, N. Y.
Michel, A. Eugene & Staff, 116 Nassau St., New York, N. Y.
Snow, Walter B. & Staff, 60 High St., Boston Square, Boston, Mass.
Whipple's Technical Libraries, (Inc.), Allston Square, Boston, Mass.

AERONAUTICAL
Allison, Lawrence M., Route No. 5, Lawrence, Kan.
Black, A. & D. R., 22 East 17th St., New York, N. Y.
Klemin, Alexander, College Point, Long Island, N. Y.

AIR CONDITIONING
Braemer Engineering Co., Stephen Girard Bldg., Philadelphia, Pa.
Briner, E. A., 559 Central Ave., E. Orange, N. J.
Goubert, August A., 90 West St., New York, N. Y.

AIR DRYING
Gobert, Aug. A., 90 West St., New York, N. Y.

AMMONIA RECOVERY
Unger, John S., 4700 Beacon St., Chicago, Ill.

APPRAISALS
(See also Valuation)
Allison, James E. & Co., 1017 Olive St., St. Louis, Mo.
Almert, Harold, 209 S. La Salle St., Chicago, Ill.
Arison, Goodwin and Associates, 327 So. La Salle St., Chicago, Ill.
Bacon, George W., Ford, Bacon & Davis, 115 Broadway, New York, N. Y.
Bunnell, Sterling H., 103 Park Ave., New York, N. Y.
Burns & McDonnell, 402 Interstate Bldg., Kansas City, Mo.
Cantell, M. T., 1302 Union Trust Bldg., Winnipeg, Canada
Caracristi, V. Z., 43 Broad St., New York, N. Y.
Carr, E. W. (Inc.), 415-17 Gravier St., New Orleans, La.
Chester, J. N., 1107-1114 Union Bank Bldg., Pittsburgh, Pa.
Colwell, James V. V., 105 W. 40th St., New York, N. Y.
Day & Zimmermann, (Inc.), 611 Chestnut St., Philadelphia, Pa.
Donnelly, William T., 17 Battery Place, New York, N. Y.
Fassett, Francis K., 1302-1303 U. B. Bldg., Dayton, Ohio
Freyn, Brassert & Co., 122 S. Michigan Ave., Chicago, Ill.
Gillespie, Solomon, E., 606 Sumpter Bldg., Dallas, Tex.
Green, Samuel M. Co., Springfield, Mass.
Hastings, Glen B., First Nat'l Bank Bldg., Williamsport, Pa.
Haven, H. M. & Crosby, Wm. W., 40 Court St., Boston, Mass.
Hubbard, Harris & Rowell, (Inc.), 1047 Broad St., Bridgeport, Conn.
Jackson, Dugald C., Jackson & Moreland, 387 Washington St., Boston, Mass.
Kennedy, William P., 1767 Broadway, at 57th St., New York, N. Y.
Knowles, Morris (Inc.), 1200 B. F. Jones Bldg., Pittsburgh, Pa.
Leonard, David E., 608 East 105th St., Cleveland, Ohio
Mason & Wilson, 2-4 Stone St., New York, N. Y.
Mosher, W. H., Industrial Planning Corp'n, 80 W. Genesee St., Buffalo, N. Y.
Parsons, H de B., 22 William St., New York, N. Y.
Poole, Cecil P., Atlanta, Ga.
Prindle, H. B., Grand Central Terminal, Rm. 5726, New York, N. Y.
Spengler, Warren D., 870 Hanna Bldg., Cleveland, Ohio
Toltz, King and Day, (Inc.), 1410 Pioneer Building, St. Paul, Minn.
White, J. G. Engineering Corp'n, 43 Exchange Place, New York, N. Y.

ARBITRATION
(See Industrial Relations)

ARCHITECTURAL
(See also Mill Architects)
Ancona, John F., Cutler Bldg., Rochester, N. Y.
Baldwin, Bert L., 1201-4 Second Nat'l Bank Bldg., Cincinnati, Ohio
Ballinger Co., S. E. Cor 12th & Chestnut, Philadelphia, Pa.
Cantell, M. T., 1302 Union Trust Bldg., Winnipeg, Canada
Christie, W. Wallace, 66 W. Ridgewood Ave., Ridgewood, N. J.
Densmore, Edward D., 88 Broad St., Boston, Mass.
Francisco & Jacobus, 511 5th Ave., New York, N. Y.
Green, Samuel M. Co., Springfield, Mass.
Kellogg, Alfres S., 89 Franklin St., Boston, Mass.
Lane, H. M. Co., 701 Owen Bldg., Detroit, Mich.
Lane, Horace H., 2320 Dime Bank Bldg., Detroit, Mich.
McClintock & Craig, 33 Lyman St., Springfield, Mass.
Naegeley, John C., 6611 Ridge Ave., Philadelphia, Pa.
Thomson, Samuel G., 125 Riverside Drive, New York, N. Y.
Toltz, King and Day, (Inc.), 1410 Pioneer Building, St. Paul, Minn.

AUDITS
Arison, Goodwin and Associates, 327 So. La Salle St., Chicago, Ill.
Colley & Marvin Co., 15 Ashburton Place, Boston, Mass.

Digitized by Google

AUDITS (Continued)
Scovell, Wellington & Co., 110 State St., Boston, Mass.
Smith, Gershom, 40 Wall St., New York, N. Y.

AUTOMATIC
Shaw, Louis E., 179 N. Parkway, East Orange, N. J.

AUTOMATIC MACHINERY
Batavia Service Corp'n, 29 Broadway, New York, N. Y.
Dowd Engineering Co., 131 West 39th St., New York, N. Y.
Frick, John, 701 Denckla Bldg., Philadelphia, Pa.
Hill, Herbert M., 801 Lexington Ave., New York, N. Y.
Lee, William F., 713 E. Franklin St., Richmond, Va.
Mayo, Edward H., 412 Traction Terminal Bldg., Indianapolis, Ind.
New Era Machinery Designing Co., 215 Parkway Bldg., Philadelphia, Pa.
Peet, Edwin B., 6 North 21st St., E. Orange, N. J.
Roe, Walter H., Spayth Block, Tiffin, Ohio
Wildermann, Rudolf, 160 5th Ave., New York, N. Y.

AUTOMOBILE DEVELOPMENT
Brush, Alanson P., 714-715 Kresge Bldg., Detroit, Mich.

AUTOMOBILE MANUFACTURE
U. S. Products Corp'n, 1428 McCormick Bldg., Chicago, Ill.

AUTOMOBILE PARTS
Myers, Cornelius T., Rahway Nat'l Bank Bldg., Rahway, N. J.

AUTOMOTIVE
Batavia Service Corp'n, 29 Broadway, New York, N. Y.
Bernner, Milton St. John, 46 Whitney Ave., Elmhurst, L. I., N. Y.
Cravens, George W., Westfield, N. J.
Dodge, Adiel Y., Room 214, Badger Bldg., Racine, Wis.
Halbfass, Arnold J., 11 Nischeweg, Berne, Switzerland
Kemble, Thomas S., 5103 Euclid Ave., Cleveland, Ohio
Kennedy, William P., 1767 Broadway, at 57th St., New York, N. Y.
Manly & Veal, 250 W. 54th St., New York, N. Y.
Myers, Cornelius T., Rahway Nat'l Bank Bldg., Rahway, N. J.
Reed, W. F., 1602-3 Merchants Bank, Indianapolis, Ind.
Reed & Glaser, 1602-3 Merchants Bank, Indianapolis, Ind.
U. S. Products Corp'n, 1428 McCormic Bldg., Chicago, Ill.
Weaver & Kemble, 5103 Euclid Ave., Cleveland, Ohio
Wilhelm, J. H. (Inc.), 41 W. 39th St., New York, N. Y.

—Designing
Engineering & Commerce Corp'n, 461 8th Ave., New York, N. Y.

—Manufacturing
Kennedy, William P., 1767 Broadway, at 57th St., New York, N. Y.

B

BALLISTICS
Gunther, Charles O., Stevens Institute of Technology, P. O. Box 77, Hoboken, N. J.
Webster, Arthur Gordon, 85 William St., Worcester, Mass.

BEARINGS
Bierbaum, Christopher H., 1011 Mutual Life Building, Buffalo, N. Y.

BOILERS, LOCOMOTIVE
Wood, Wm. H., 10 South Ave., Media, Pa.

BRASS MILLS
Thompson, Hugh L., Waterbury, Conn.

BRIDGES
Burr, William H., 110 Broadway, New York, N. Y.
Cantell, M. T., 1302 Union Trust Bldg., Winnipeg, Canada
Luten, Daniel B., 1056 Lemcke Annex, Indianapolis, Ind.
Seaman, Henry B., 368 Grand Ave., Brooklyn, N. Y.
Thomson, T. Kennard, 50 Church St., New York, N. Y.

BUILDING EQUIPMENT
Richardson & Gay, 220 Devonshire St., Boston, Mass.

—Electrical
Pattison, Frank A., 1182 Broadway, New York, N. Y.

—Mechanical
Allan, Charles D., 1732 S. Michigan Blvd., Chicago, Ill.
Lee, William F., 713 E. Franklin St., Richmond, Va.
Pattison, Frank A., 1182 Broadway, New York, N. Y.
Taylor & Downes, 801 Gaston Bldg., Dallas, Texas

BUILDINGS
(See also Constructing, Foundations, Industrial, Office)
Thomson, Samuel G., 125 Riverside Drive, New York, N. Y.
Thomson, T. Kennard, 50 Church St., New York, N. Y.

C

CABLES, HIGH TENSION
Adams, Comfort A., 33 West 39th St., New York, N. Y.

CABLEWAYS
Horton, John T., 242 Bradhurst Ave., New York, N. Y.
Newell, Wallace L., 1017 Alaska Building, Seattle, Washington
Sherman, W. D., 222 N. Wilton Place, Los Angeles, Cal.

CAN MAKING MACHINERY
Peet, Edwin B., 6 North 21st St., E. Orange, N. J.

CANALS
Thomson, T. Kennard, 50 Church St., New York, N. Y.

CAST IRON
Moldenke, Dr. Richard, Watchung, N. J.

CASTINGS, MALLEABLE
Moldenke, Dr. Richard, Watchung, N. J.

CEMENT PLANTS (Portland)
Baker, Wm. H., 120 Broadway, New York, N. Y.
Fuller Engineering Co., Allentown, Pa.
Meade, Richard K. & Co., 11 E. Lafayette St., Baltimore, Md.
Meron, Frederick, 27 Cedar St., New York, N. Y.

CENTRIFUGALS
Hiller, Joseph L., 21 S. 12th St., Philadelphia, Pa.

Digitized by Google

Lewis, D. J. Jr., Woolworth Bldg., New York, N. Y.

CHEMICAL

Alsberg, Julius, 140 South Dearborn St., Chicago Ill.
Brown, Herman E., 342 Madison Ave., New York, N. Y.
Cannon-Swenson Co., 53 W. Jackson Blvd., Chicago, Ill.
Foster, C. Louis, 719 High St., Newark, N. J.
Griepe, Augustus W. H., 707 Prospect Ave., New York, N. Y.
Industrial Engineers Corp'n, Suite 920 Victoria Bldg., St. Louis, Missouri
Johnson, Henry S., R. F. D. No. 14, Babylon, L. I., N. Y.
Larkin & Pratt, Arcade Bldg., St. Louis, Mo.
Little, Arthur D. (Inc.), 30 Charles River Road, Cambridge, Mass.
Luehrs, Daniel M., Ellaston Bldg., Cleveland, Ohio
Manitus Engineering Co. (Inc.), 15 East 40th St., New York, N. Y.
Meade, Richard K. & Co., 11 E. Fayette St., Baltimore, Md.
Mosher, W. H., Industrial Planning Corp'n, 80 W. Genesee St., Buffalo, N. Y.
Pike, Robert D., 74 New Montgomery St., San Francisco, Cal.
Pope, Frederick, 366 Fifth Ave., New York, N. Y.
Riley, Champlain L., 101 Park Ave., New York, N. Y.
Rittman, W. F., c|o Carnegie Institute, Pittsburgh, Pa.
Robinson, Louis G., 31 E. 4th St., Cincinnati, Ohio
Simsohn, Julian S., S. E. Cor. Broad St. & Girard Ave., Philadelphia, Pa.
Wayte, W. J. (Inc.), 1 Liberty St., New York, N. Y.

—By-Products

Hessenbruch, George S., Suite 920 Victoria Bldg., St. Louis, Mo.
McIntire, Charles V., 66 Broadway, New York, N. Y.

CHEMICAL WORKS

Meade, Richard K. & Co., 11 E. Fayette St., Baltimore, Md.
Meron, Frederick, 27 Cedar St., New York, N. Y.
T-S-M-E-Engineering Corp'n, Iroquois Bldg., Buffalo, N. Y.

—Equipment

Jacoby, Henry E., 95 Liberty St., New York, N. Y.
Viola, Bartholomew, 309 Broadway, New York, N. Y.

CHIMNEYS (Concrete)

Belcher, P. W., 219 Dooley Block, Salt Lake City, Utah

CHOCOLATE MAKING MACHINERY

Carver, Fred S., 8 West 40th St., New York, N. Y.

CIVIL

Allen, Henry A., Room No. 28, 154 West Randolph St., Chicago, Ill.
Baker, Charles Whitney, 30 Church St., New York, N. Y.
Bassinger, James Garnett, 22 William St., New York, N. Y.
Bennett, Wilmer C., 189 W. Madison St., Chicago, Ill.
Bixby, William H., 1709 Lanier Place, N. W., Washington, D. C.
Brewster, Henry B., 613 Dillaye Bldg., Syracuse, N. Y.
Bryant Engineering Co., 501 Detroit Savings Bank Bldg., Detroit, Mich.
Bumsted, E. B., Insurance Exchange Bldg., San Francisco, Cal.
Burr, William H., 120 Broadway, New York, N. Y.
Camp, E. V., Box 421, Atlanta, Ga.
Carse, David B., International Engrg. & Financing Corp., 111 Broadway, New York, N. Y.
Chapin, Warren W., 347 Madison Ave., New York, N. Y.
Chase, Frank D. (Inc.), 645 North Michigan Ave., Chicago, Ill.
Chester, J. N., 1107-1114 Union Bank Bldg., Pittsburgh, Pa.
Conard, William R., 322 High St., Burlington, N. J.
Cory, Russell G., 50 Church St., New York, N. Y.
Ferguson, Hardy S., 200 Fifth Ave., New York, N. Y.
Finkle, Frederick Cecil, 445-449 I. W. Hellman Bldg., Los Angeles, Cal.
Fuller, George W., 170 Broadway, New York, N. Y.
Gilmore, T. N., 136 Liberty St., New York, N. Y.
Greydanus, S. E., 112 Ellison St., Cor. Main, Paterson, N. J.
Hamilton, John W., 29 Broadway, New York, N. Y.
Hardesty, Frederick S., Commercial Nat'l Bank Bldg., Washington, D. C.
Hazen, Whipple & Fuller, 30 E. 42nd St., New York, N. Y.
Hering, Rudolph, 40 Lloyd Rd., Montclair, N. J.
Hill, Nicholas S., Jr., 112 E. 19th St., New York, N. Y.
Hodge, Harry S., University, Va.
Holland, Ackerman & Holland, 106 E. Liberty St., Ann Arbor, Mich.
Howes, Benjamin A., 70 Fifth Ave., New York, N. Y.
Industrial Engineers Corp'n, Suite 920 Victoria Bldg., St. Louis, Mo.
Knowles, Morris (Inc.), 1200 B. F. Jones Bldg., Pittsburgh, Pa.
Koebig, A. W., 841 Title Insurance Bldg., Los Angeles, Cal.
Landreth, Olin H., 156 5th Ave., New York, N. Y.
Lauer, Herbert H., 128 So. 16th St., Allentown, Pa.
Ledoux, J. W., 112 North Broad St., Philadelphia, Pa.
Luehrs, Daniel M., Ellaston Bldg., Cleveland, Ohio
Mees, Curtis A., 310 Trust Bldg., Charlotte, N. C.
Metcalf and Eddy, 14 Beacon St., Boston, Mass.
Monks, A. G., 99 Chauncy St., Boston, Mass.
Moran, Daniel E., Moran, Maurice & Proctor, 55 Liberty St., New York, N. Y.
Newell, F. H., 1829 Phelps Pl., N. W., Washington, D. C.
Parsons, H. de B., 22 William St., New York, N. Y.
Ray, Dr. David H., Arcadia, Los Angeles, Cal.
Robinson, Dwight P. & Co. (Inc.), 125 East 46th St., New York, N. Y.
Rogers, C. M., Daytona, Fla.
Salisbury, Royal D. Co., 1600 Downing St., Denver, Colo.
Sanderson & Porter, 52 William St., New York, N. Y.
Seaman, Henry B., 368 Grand Ave., Brooklyn, N. Y.

Digitized by Google

CIVIL (Continued)
Sorzano, Julio F., 42 Broadway, New York, N. Y.
Spengler, Warren D., 870 Hanna Bldg., Cleveland, Ohio
Swain, Geo. F., Harvard University, Cambridge, Mass.
Toltz, King and Day, (Inc.), 1410 Pioneer Bldg., St. Paul, Minn.
Wallace, Joseph H. & Co., 5 Beekman St., New York, N. Y.
White, Gilbert C., Durham, N. Y.
Wilcox, Ralph M., 279 Main St., Middletown, Conn.
Wilson, Percy H., Devon, Chester Co., Pa.
Wright, William Q., 210 Merchants Exchange Bldg., San Francisco, Cal.
Zehr, V. A., Pekin, Ill.

COAL CRUSHING MACHINERY
Hiller, Joseph L., 21 S. 12th St., Philadelphia, Pa.

COAL HANDLING PLANTS
Findley, W. D., Room 902, 141 Milk St., Boston, Mass.
Lang, Wm H., 538 So. Dearborn St., Chicago, Ill.

COAL POCKETS
Suck, Adolph, Hyde Park Stations, Boston, Mass.

COAL PREPARATION MACHINERY
Fuller Engineering Co., Allentown, Pa.
Hiller, Joseph L., 21 S. 12th St., Philadelphia, Pa.

COAL WASHING
Hiller, Joseph L., 21 S. 12th St., Philadelphia, Pa.

COCOA PRESSING EQUIPMENT
Carver, Fred S., 8 West 40th St., New York, N. Y.

COKE OVENS
Hessenbruch, George S., Suite 920 Victoria Bldg., St. Louis, Mo.
McIntire, Charles V., 66 Broadway, New York, N. Y.

COKE PLANT EQUIPMENT
Hiller, Joseph L., 21 S. 12th St., Philadelphia, Pa.

COMBUSTION
American Industrial Engrg. Co., Monadnock Block, Chicago, Ill.
Bryant Engineering Co., 501 Detroit Savings Bank Bldg., Detroit, Mich.
Caracristi, V. Z., 43 Broad St., New York, N. Y.
Cary, Albert A., 95 Liberty St., New York, N. Y.
Fuller Engineering Co., Allentown, Pa.
Lewis & Watts, 501 Lewis Bldg., Portland, Oregon
Mattsson, A. George, Great Lakes Eng. Works., River Rouge, Mich.
Merritt, James S., 1010 Harrison Bldg., Philadelphia, Pa.
Misostow, Henry, 536 Rush St., Chicago, Ill.
Pike, Robert D., 74 New Montgomery St., San Francisco, Cal.
Quigley, W. S., 26 Cortlandt St., New York, N. Y.
Renkin, W. O., 26 Cortlandt St., New York, N. Y.
Scrivenor, Arthur, Mutual Bldg., Richmond, Va.
States, Louis A., Gastonia, N. C.
Stevens, John A., 8 Merrimack St., Lowell, Mass.
Uehling, F. F., Empire Bldg., New York, N. Y.
Woolson, Clifford G., 39 Cortlandt St., New York, N. Y.

COMMERCIAL DEVELOPMENT
Anderson, A. C., 524-6 Bee Bldg., Omaha, Neb.
White, Percival, 20 Wedgemere Ave., Winchester, Mass.

CONCRETE (See also Storage Bins)
Dickson, Geo. L., 5716 Euclid Ave., Cleveland, Ohio
Roekler, C. J., State Bank Bldg., Richmond, Va.

CONCRETE MIXING MACHINERY
Sherman, W. D., 222 N. Wilton Place, Los Angeles, Cal.

CONSTRUCTING
Baker, Wm. H., 120 Broadway, New York, N. Y.
Conard, William R., 322 High St., Burlington, N. J.
Crecelius & Phillips, 1302 Hanna Bldg., Cleveland, Ohio
Green, Samuel M. Co., Springfield, Mass.
Kidde, Walter & Co. (Inc.), 140 Cedar St., New York, N. Y.
Robinson, Dwight P. & Co. (Inc.), 125 East 46th St., New York, N. Y
Sanderson & Porter, 52 William St., New York, N. Y.
Stone & Webster (Inc.), 147 Milk St., Boston, Mass.

—Building
MacLeod, Norman MacCallum, 47 W. Londen St., Germantown, Philadelphia, Pa.

—Sub-Aqueous
Moran, Daniel E., care Moran, Maurice & Proctor, 55 Liberty St., New York, N. Y.

CONSTRUCTION SHOPS
Meron, Frederick, 27 Cedar St., New York, N. Y.

CONSULTATION
Allen, Henry A., Room No. 23, No. 154 West Randolph St., Chicago, Ill.
Cary, Albert A., 95 Liberty St., New York, N. Y.
Fuller Engineering Co., Allentown, Pa.
Haven, H. M. & Crosby, Wm. W., 40 Court St., Boston, Mass.
Parks, Byron E. Son, 625 Michigan Trust Bldg., Grand Rapids, Mich.
Stone & Webster (Inc.), 147 Milk St., Boston, Mass.
Wilson, James A., 2-4 Stone St., New York, N. Y.

CONTRACTING
Frankenberg, George T. 705 Columbus Savings & Trust Bldg., Columbus, Ohio
Slining, B. G., Carlinville, Ill.
White, J. G. Engineering Corpn., 43 Exchange Place, New York, N. Y.
Wright, Paul, 350 Brown-Mark Bldg., Birmingham, Ala.

CONVEYING
Buckley, John H., 30 Church St., Room 1514, New York, N. Y.
Elmer, Nixon W., Quincy, Mass.
Findley, W. D., Room 902, 141 Milk St., Boston, Mass.
Lee, William F., 713 E. Franklin St., Richmond, Va.
Lewis & Watts, 501 Lewis Bldg., Portland, Oregon
Mayo, Edward H., 412 Traction Terminal Bldg., Indianapolis, Ind.
Posey, James, 925 Fidelity Bldg., Baltimore, Md.

COST
Bedaux, Chas. E. Co., 4500 Euclid Ave., Cleveland, Ohio

COST ACCOUNTING (See also under Power Plants)
Arison, Goodwin and Associates, 327 So. La Salle St., Chicago, Ill.

Digitized by Google

Churchill, W. L., 103 Park Ave., New York, N. Y.
Cooley-Marvin Co., 15 Ashburton Place, Boston, Mass.
Emerson, Harrington, 30 Church St., New York, N. Y.
Ingham, Howard M., 140 Nassau St., New York, N. Y.
Kidder, Walter M., 127 West 56th St., New York, N. Y.
McCall, Brownell & Co. (Inc.), 33 West 42nd St., New York, N. Y.
Meron, Frederick, 27 Cedar St., New York, N. Y.
Scott, Walter Glenn, 52 Vanderbilt Ave., New York, N. Y.
Scovell, Clinton H., 110 State St., Boston, Mass.
Szepesi Industrial Organization, 673 Boylston St., Boston, Mass.
Watson, John N., 511 Fifth Ave., New York, N. Y.
Wellington, O. Oliver, 110 State St., Boston, Mass.

COTTON SEED CRUSHING MACHINERY
Neale, William Mc. C., P. O. Box 351 Greensboro, N. C.

CRANES AND HOISTS
Dunscomb, W. S., Twinsburg, Ohio
Kinney, N. J., 30 Church St., New York, N. Y.

CUPOLAS
Robinson, Louis G., 31 E. 4th St., Cincinnati, Ohio

D

DAMS
Moran, Daniel E., care Moran, Maurice & Proctor, 55 Liberty St., New York, N. Y.

DERRICKS
Horton, John T., 242 Bradhurst Ave., New York, N. Y.

DESIGNING (See also Electrical Machinery Engines, Gas; Industrial Plants, Machinery, Power Plants, Structural, Tool)
Barnes, William O., Leominster, Mass.
Battin, Harold T., 561 W. 58th St., New York, N. Y.
Buckley, John H., 30 Church St., Room 1514, New York, N. Y.
Dodge, Adiel Y., Room 214, Badger Bldg., Racine, Wis.
Fuller Engineering Co., Allentown, Pa.
Hill, George F., 51 East 42nd St., New York, N. Y.
Lang, Wm. H., 538 So. Dearborn St., Chicago, Ill.
McMurty, Alden L., Stamford, Conn.
Nelson, Alfred C., The Wm. B. Pollok Co., Youngstown, Ohio
Nikonow, J. P., 136 Liberty St., New York, N. Y.
Sintz, Claude, 614 First St., Detroit, Mich.
White, J. G. Engineering Corp'n, 43 Exchange Place, New York, N. Y.
Wilhelm, J. H. (Inc.), 42 W. 39th St., New York, N. Y.

DEVELOPMENT (See Commercial Hydroelectric, Inventions, Laboratory Research, Oil Property, Power)

DIE-SINKING EQUIPMENT
Keller, Joseph F, 70 Washington St., Brooklyn, N. Y.

DISTRIBUTION (Foreign and Domestic)
Murray, J. Vincent, 56 W. Randolph St., Chicago, Ill.

DOCKS AND WAREHOUSES
Toltz, King and Day (Inc.), 1410 Pioneer Bldg., St. Paul, Minn.

DRAINAGE & RECLAMATION (See also Irrigation, Land Reclamation)
Bennett, Howard D., 2114 Allendale St., Baltimore, Md.
Massey, Geo. B. Co., Peoples Gas Bldg., Chicago, Ill.
White, J. G. Engineering Corp'n, 43 Exchange Place, New York, N. Y.
Wright, William Q., 210 Merchants Exchange Bldg., San Francisco, Cal.

DREDGES
Bennett, Howard D., 2114 Allendale St., Baltimore, Md.
Massey, Geo. B. Co., Peoples Gas Bldg., Chicago, Ill.
Wright, William Q., 210 Merchants Exchange Bldg., San Francisco, Cal.

—Hydraulic
Bennett, Howard D., 2114 Allendale St., Baltimore, Md.

DRY DOCKS
Donnelly, William T., 17 Battery Place, New York, N. Y.

DRYING (See also Air)
Braemer Engineering Co., Stephen Girard Bldg., Philadelphia, Pa.
Fuller Engineering Co., Allentown, Pa.
Ellingwood, Elliott L., 338 H. W. Hellman Bldg., Los Angeles, Cal.

—Paper
Kedy, Stiles F., 12 Pearl St., Boston, Mass.

—Textile
Kedy, Stiles F., 12 Pearl St., Boston, Mass.

DUST COLLECTION
Meade, Richard K. & Co., 11 E. Fayette St., Baltimore, Md.

E

EFFICIENCY (See also Production)
Bedaux, Chas. E. Co., 4500 Euclid Ave., Cleveland, Ohio
Emerson, Harrington, 30 Church St., New York, N. Y.
Gerard, Graham & Co., 202 S. State St., Chicago, Ill.
Kidder, Walter M., 127 West 56th St., New York, N. Y.
Scott, Walter Glenn, 52 Vanderbilt Ave., New York, N. Y.
Scoville, Wellington & Co., 110 State St., Boston, Mass.
Shepard, George H., Purdue University, La Fayette, Ind.

ELECTRIC APPLIANCES, DOMESTIC
Swoboda (Inc.), H. O., Empire Bldg., Pittsburgh, Pa.

ELECTRIC FURNACE PRODUCTS
Hatch, Edwin G., 220 Broadway, New York, N. Y.

ELECTRIC INSTALLATIONS
Acheson, A. R., 601 Eckel Theatre Bldg., Syracuse, N. Y.
Garland, C. M., 1140 First National Bank Bldg., Chicago, Ill.

ELECTRIC MACHINERY (Designing)
Adams, Comfort A., 33 West 39th St., New York, N. Y.

ELECTRIC RAILWAYS
Hutchinson, Cary T., 17 West 46th St., New York, N. Y.

ELECTRICAL
Adams, Comfort A., 33 West 39th St., New York, N. Y.
Alexander & Dowell, Washington Loan & Trust Bldg., Washington, D. C.
Allen, Henry A., Room No. 23 No. 154 West Randolph St., Chicago, Ill.

Digitized by Google

ELECTRICAL (Continued)

Allison, James E. & Co., 1017 Olive St., St. Louis, Mo.
Almert, Harold, 209 S. La Salle St., Chicago, Ill.
Arnold Co., 105 S. La Salle St., Chicago, Ill.
Baehr, William A. Organization, 122 So. Michigan Ave., Chicago, Ill.
Baldwin, Bert L., 1201-4 Second Nat'l Bank Bldg., Cincinnati, Ohio
Ballinger Co., S. E. Cor. 12th & Chestnut, Philadelphia, Pa.
Barnes, Harold B., 911 Foster Bldg., Denver, Colo.
Behrend, Bernard A., 200 Devonshire St., Boston, Mass.
Biggs, W. E. Engineering Co., Knoxville, Tenn.
Brown, Edward C. & Co., 220 Devonshire St., Boston, Mass.
Camp, E. V., Box 421, Atlanta, Ga.
Carse, David B., International Engrg. & Financing Corp'n, 111 Broadway, New York, N. Y.
Cory, Russell G., 50 Church St., New York, N. Y.
Cravens, George W., Westfield, N. J.
Croney, P. Alfred, 608 Orange St., Wilmington, Del.
Dodge, Adiel Y., Room 214, Badger Bldg., Racine, Wis.
Dowell, Arthur E., Jr., Washington Loan & Trust Bldg., Washington, D. C.
Eadie, Freund & Campbell, 7 W. 45th St., New York, N. Y.
Egbert, Charles C., Gluck Bldg., Niagara Falls, N. Y.
Engineering Sales Co. (Inc.), New Orleans, La.
Frans, Walter G., 1703 Union Trust Bldg., Cincinnati, Ohio
Gibbons, James O. G., 207 Market St., Newark, N. J.
Hammer, Edwin W., 160 Broadway, New York, N. Y.
Hanscom, William Wallace, 848 Clayton St., San Francisco, Cal.
Hardesty, Frederick S.. Commercial Nat'l Bank Bldg., Washington, D. C.
Harris, Ford W., 933 Higgins Bldg., Los Angeles, Cal.
Hatch, Edwin G., 220 Broadway, New York, N. Y.
Hirsch, Gustav, 200 Hartman Bldg., Columbus, Ohio
Hollis French & Allen Hubbard, 88 Pearl St., Boston, Mass.
Hoxie, Geo. L., San Fernando Bldg., Los Angeles, Cal.
Humphrey, Henry H., 1312 Chemical Bldg., St. Louis, Mo.
Hutchinson, Cary T., 17 West 46th St., New York, N. Y.
Industrial Engineers Corp'n, Suite 920 Victorial Bldg., St. Louis, Mo.
Jackson, Dugald C., Jackson & Moreland, 337 Washington St., Boston, Mass.
Jackson, Wm. B., Pittsfield, Mass.
Jacobson, Ernst, 206 E. Fourth St., Davenport, Iowa
Jellett, Stewart A. Co., 1200 Locust St., Philadelphia, Pa.
Kaighn, Herbert E., 3143-45 Dupont Bldg., Wilmington, Del.
Klauder, Louis T., 901 Pennsylvania Bldg., Philadelphia, Pa.
Koebig, A. W., 841 Title Insurance Bldg., Los Angeles, Cal.
Lancaster, W. C., 32 Pearl St., New York, N. Y.
Larkin & Pratt, Arcade Bldg., St. Louis, Mo.
Lee, W. S., 511 5th Ave., New York, N. Y.
Lindsay, W. Edward, Bayville, Ocean Co., N. J.
Lyman, James, Sargent & Lundy, 72 West Adams St., Chicago, Ill.
McAllister, Addams S., 248 West 76th St., New York, N. Y.
MacLeod, Norman MacCallum, 47 W. Louden St., Germantown, Philadelphia, Pa.
Marshall, Norman, Waltham, Mass.
Mershon, Ralph D., 143 Liberty St., New York, N. Y.
Moore, W. E. & Co., Union Bank Bldg., Pittsburgh, Pa.
Mullergren, Arthur L., Firestone Bldg., Kansas City, Mo.
Pickard, Greenleaf W., 59 Dalton Road, Newton Centre, Mass.
Pillsbury, Charles L. Co., 1200 Second Ave., S., Minneapolis, Minn.
Poole, Cecil P., Atlanta, Ga.
Proutt, F. G., 874 Randolph Bldg., Memphis, Tenn.
Rabbitt, James A. Engineering Corp'n, 115 Broadway, New York, N. Y.
Rae, Frank B., 2214 Durant Ave., Berkley, Cal.
Reeds, Clarence, Reeds & Thorpe, 60 Prospect St., Hartford, Conn.
Rice, Calvin W., 29 West 39th St., New York, N. Y.
Richardson & Gay, 220 Devonshire St., Boston, Mass.
Robinson, Dwight P. & Co., (Inc.), 125 East 46th St., New York, N. Y.
Rossman, J. G., Scotch Plains, N. J.
Rucker, B. Parks, 103 Park Ave., New York, N. Y.
Salisbury, Royal D. Co., 1600 Downing St., Denver, Colo.
Sanderson & Porter, 52 William St., New York, N. Y.
Sawford, Frank, 2076 49th Avenue West, Kerrisdale, Vancouver, B. C.
Sawtelle, E. M., 5 Beekman St., New York N. Y.
Sayer, E. Y., 1328 Broadway, New York, N. Y.
Sessions, Frank L., 422 Kirby Bldg., Cleveland, Ohio
Smith, Harold B., Polytechnic Inst., Worcester, Mass.
Spengler, Warren D., 870 Hanna Bldg., Cleveland, Ohio
Stebbins, Theodore, 34 Gramercy Park, New York, N. Y.
Sutton, Frank, 140 Cedar St., New York, N. Y.
Swoboda (Inc.), H. O., Empire Bldg., Pittsburgh, Pa.
Taylor, John O., 8 S. Dearborn St., Chicago, Ill.
Thomas, Percy H., 120 Broadway, New York, N. Y.
Tolts, King & Day (Inc.), 1410 Pioneer Bldg., St. Paul, Minn.
Vaughan, John F., 185 Devonshire St., Boston, Mass.
Vick, A. T. Co. (Inc.), 1020 Capitol Ave., Houston, Texas
Westcott & Mapes (Inc.), 207 Orange St., New Haven, Conn.
White, J. G. Engineering Corp'n, 43 Exchange Pl., New York, N. Y.
Whiting, Charles W., 148 State St., Boston, Mass.

ELECTROLYTIC PLANTS

T-S-M-E-Engineering Corp'n, Iroquois Bldg., Buffalo, N. Y.

ELEVATORS

(See also Grain)
Posey, James, 925 Fidelity Bldg., Baltimore, Md.

ENGINE REGULATION

Sargent, John W., 308 Benefit St., Providence, R. I.

Digitized by Google

ENGINES

—Diesel

Schreck, H., 729 Cattell St., Easton, Pa.
Verhey, Hubert O., 1028 Real Estate Trust Bldg., Philadelphia, Pa.

—Gas

Dock, Herman, Engineers' Club, New York, N. Y.
Suplee, Henry H., Commercial Nat'l Bank Bldg., Washington, D. C.

—Gas (Designing)

Shaw, Louis E., 179 N. Parkway, East Orange, N. J.

—Internal Combustion

Kemble, Thomas S., 5103 Euclid Ave., Cleveland, Ohio
Lucke, Charles Edward, 117th St. & Broadway, New York, N. Y.
Parker, Francis W., 1410 Marquette Bldg., Chicago, Ill.
Weaver & Kemble, 5103 Euclid Ave., Cleveland, Ohio

—Uniflow

Stevens, R. C., 560 Lincoln Ave., Erie, Pa.

EQUIPMENT

(See also Building, Chemical Works, Cocoa Pressing, Coke Plant, Oil Pressing, Petroleum Distillation, Projectile Producing, ducing, Railway, Sprinkler)

Buckley, John H., 50 Church St., Room 1514, New York, N. Y.
Caracristi, V. Z., 43 Broad St., New York, N. Y.
Colwell, James V. V., 105 W. 40th St., New York, N. Y.
Rothwell, C. R., 192 Broadway, New York, N. Y.

—Electrical

Schloss, Newton L., 581 W. 143rd St., Apt. 64, New York, N. Y.

ESTIMATES

Anderson, A. C., 524-6 Bee Bldg., Omaha, Neb.
Harrison, G. Charter, 31 Nassau St., New York, N. Y.

EVAPORATORS

Honolulu Iron Works Co., Woolworth Bldg., New York, N. Y.
Manitus Engineering Co. (Inc.), 15 E. 40th St., New York, N. Y.

EXAMINATION AND REPORTS

(See also Investigations)

Arison, Goodwin & Associates, 327 S. LaSalle St., Chicago, Ill.
Basinger, James Garnett, 22 William St., New York, N. Y.
Batavia Service Corp'n, 29 Broadway, New York, N. Y.
Brinton, Willard C., 17 W. 44th St., New York, N. Y.
Caracristi, V. Z., 43 Broad St., New York, N. Y.
Carse, David B., International Engrg. & Financing Corp'n, 111 Broadway, New York, N. Y.
Cary, Albert A., 95 Liberty St., New York, N. Y.
Collins, Hubert E., 132 Boyce Ave., Utica, N. Y.
Crowell, Henry W., Room 1026 Kinney Bldg., Newark, N. J.
Day & Zimmerman (Inc.), 611 Chestnut St., Philadelphia, Pa.
Fassett, Francis K., 1302-1308 U. B. Bldg., Dayton, Ohio
Hastings, Glen B., First Nat'l Bank Bldg., Williamsport, Pa.
Hickman, Charles D., Bellevue Court Bldg., Philadelphia, Pa.
Holland, Ackerman & Holland, 106 E. Liberty St., Ann Arbor, Mich.
Jackson, Dugald C., Jackson & Moreland, 387 Washington St., Boston, Mass.
Keighn, Herbert E., 3143-5 Dupont Bldg., Wilmington, Del.
Kraemer, Milton, 515-517 Rialto Bldg., San Francisco, Cal.
Manitus Engineering Co. (Inc.), 15 E. 40th St., New York, N. Y.
Manly & Veal, 250 W. 54th St., New York, N. Y.
Railway & Industrial Engineers (Inc.), 25 Broad St., New York, N. Y.
Richardson & Gay, 220 Devonshire St., Boston, Mass.
Spengler, Warren D., 870 Hanna Bldg., Cleveland, Ohio
Tomlinson, Malcolm C. W., 302 Bushnell Bldg., Springfield, Ohio
Tyng, Arthur, 810 Iroquois Bldg., Buffalo, N. Y.
White, J. G. Engineering Corp'n, 43 Exchange Pl., New York, N. Y.
Woolson, Clifford G., 39 Cortlandt St., New York, N. Y.

—Steam

Bunnell, Sterling H., 103 Park Ave., New York, N. Y.

—Steam (Exhaust)

Bunnell, Sterling H., 103 Park Ave., New York, N. Y.

EXCAVATIONS

Massey, Geo. B. Co., Peoples Gas Bldg., Chicago, Ill.

EXPERIMENTAL

Mudge, Sterling W., Pratt Institute, Brooklyn, N. Y.

EXPORT CONSULTANT

Hatch, Edwin G., 220 Broadway, New York, N. Y.
Steele, Hugh E., 109 Broad St., New York, N. Y.

F

FACTORIES

(See also Sugar)

—Construction

Bennett, Wilmer C., 189 W. Madison St., Chicago, Ill.
Chase, Frank D. (Inc.), 645 N. Michigan Ave., Chicago, Ill.

—Equipment Installation

Schlank, Elias, 51 Pennsylvania Ave., Newark, N. J.
Wildermann, Rudolf, 160 5th Ave., New York, N. Y.

—Layout

Gerard, Graham & Co., 202 S. State St., Chicago, Ill.
Hastings, Glen B., First Nat'l Bank Bldg., Williamsport, Pa.
Lane, Horace H., 2820 Dime Bank Bldg., Detroit, Mich.
Mayo, Edward H., 412 Traction Terminal Bldg., Indianapolis, Ind.
Powell, William B., Industrial Planning Corp'n, 80 W. Genesee St., Buffalo, N. Y.
Scott, Walter Glenn, 52 Vanderbilt Ave., New York, N. Y.
U. S. Products Corp'n., 1423 McCormick Bldg., Chicago, Ill.
Walter Engineering Co., 216 Ludlow Bldg., Dayton, Ohio

—Management

Bartlett, D. Dana, 821 Shawmut Bank Bldg., Boston, Mass
Gerber, S. R., 309 Broadway, New York, N. Y.

Digitized by Google

FACTORIES (Continued)
Lloyd, Robert M., 347 Madison Ave., New York, N. Y.
Meron, Frederick, 27 Cedar St., New York, N. Y.

—Organization
Collins, Hubert E., 132 Boyce Ave., Utica, N. Y.

—Sprinkler Equipment
Hoagland, I. G., 80 Maiden Lane, New York, N. Y.

FERRY BOATS
Bennett, Howard D., 2114 Allendale St., Baltimore, Md.

FIBRE (Carbonized)
Hatch, Edwin G., 220 Broadway, New York, N. Y.

FIELD RESEARCH WORK
Fowler, Geo. L., 114 Liberty St., New York, N. Y.
Peterson, Frank P. & Co., 535 N. Cheyenne St., Tulsa, Okla.

—Oil and Gas
Fink, J. B., 527 Robinson Bldg., Tulsa, Okla.

FILTRATION PLANTS

—Sugar
Kent, Robert Sayre (Inc.), 50 Court St., Brooklyn, N. Y.

—Wax
Kent, Robert Sayre (Inc.), 50 Court St., Brooklyn, N. Y.

FIRE BOATS
Bennett, Howard D., 2114 Allendale St., Baltimore, Md.

FIRE PREVENTION
Ancona, John F., Cutler Bldg., Rochester, N. Y.
Hoagland, I. G., 80 Maiden Lane, New York, N. Y.
Posey, James, 925 Fidelity Bldg., Baltimore, Md.
Tomlinson, Malcolm C. W., 302 Bushnell Bldg., Springfield, Ohio
Wilson, Lester G., 2400 16th St., Washington, D. C.

FLOUR MILLING PLANTS
Ingraham, Alexander, Calgary, Alberta, Can.
Miller Franklin Basset & Co., 347 Madison Ave., New York, N. Y.

FORGE SHOPS
Ellis, Frank I., Farmers Bank Bldg., Pittsburgh, Pa.
Meron, Frederick, 27 Cedar St., New York, N. Y.

FORGING MACHINES
Loss, Henrik V., Witherspoon Bldg., Philadelphia, Pa.

FOUNDATIONS
Basinger, James Garnett, 22 William St., New York, N. Y.
Burr, William H., 120 Broadway, New York, N. Y.
Moran, Daniel E., Moran, Maurice & Proctor, 55 Liberty St., New York, N. Y.
Thomson, T. Kennard, 50 Church St., New York, N. Y.

FOUNDRY PLANTS
(See also Iron Foundry)
Carliss, Oswald T., Plainfield, N. J.
Esselstyn, Murphy & Hanford, 810 Marquette Bldg., Detroit, Mich.
Hardy, Clement A., Room 654, Railway Exchange Bldg., Chicago, Ill.
Hastings, Glen B., First Nat'l Bank Bldg., Williamsport, Pa.
Lane, H. M. Co., 701 Owen Bldg., Detroit, Mich.
Leonard, Herbert H., Industrial Planning Corp'n, 80 W. Genesee St., Buffalo, N. Y.
Moldenke, Dr. Richard, Watchung, N. J.
Moore, W. E. & Co., Union Bank Bldg., Pittsburgh, Pa.
Robinson, Louis G., 31 E. 4th St., Cincinnati, Ohio
Scott, Walter Glenn, 52 Vanderbilt Ave., New York, N. Y.
Suck, Adolph, Hyde Park Station, Boston, Mass.

FUEL
(See also Oil, Powdered Coal)
Denk, F. T., 45-46 Shannon Bldg., Pittsburgh, Pa.
Fuller Engineering Co., Allentown, Pa.
Uehling, F. F., Empire Bldg., New York, N. Y.

—Utilization
Little, Arthur D. (Inc.), 30 Charles River Rd., Cambridge, Mass.
Lucke, Charles Edward, 117th St. & Broadway, New York, N. Y.

FURNACES
(See also Cupolas, Electric)

—Designing
Myers, David Moffat, Griggs & Myers, 347 Fifth Ave., New York, N. Y.

—Electric
Hatch, Edwin G., 220 Broadway, New York, N. Y.
Hastings, Glen B., First Nat'l Bank Bldg., Williamsport, Pa.
Moore, W. E. & Co., Union Bank Bldg., Pittsburgh, Pa
Swoboda (Inc.), H. O., Empire Bldg., Pittsburgh, Pa.

—Industrial
Cary, Albert A., 95 Liberty St., New York, N. Y
Denk, F. T., 45-46 Shannon Bldg., Pittsburgh, Pa.
Fuller Engineering Co., Allentown, Pa.
Meade, Richard K. & Co., 11 E. Fayette St., Baltimore, Md.
Misostow, Henry, 536 Rush St., Chicago Ill.
Quigley, W. S., 26 Cortlandt St., New York, N. Y.
Schwab, Gustav, 4719 Yguavio Ave., Oakland, Cal.
Woolson, Clifford G., 39 Cortlandt St., New York, N. Y.

G

GAGES
Emery, A. H., Glenbrook, Conn.
Gage-Engineering Service Co., 1410 H St., N. W., Washington, D. C.

GAS
(See also Natural, Testing)
Allison, James E. & Co., 1017 Olive St., St. Louis, Mo.
Denk, F. T., 45-46 Shannon Bldg., Pittsburgh, Pa.
Forstall & Robinson, 15 Park Row, New York, N. Y.
Garland, C. M., 1140 First Natl. Bank Bldg., Chicago, Ill.
Humphreys & Miller (Inc.), 165 Broadway, New York, N. Y.
McIntire, Charles V., 66 Broadway, New York, N. Y.
Shiebler, Marvin, 80 Broadway, New York, N. Y.
Steere Engineering Co., Woodward & Horton Aves., Detroit, Mich.

Digitized by Google

Syracuse Industrial Gas Co., 206 McCarthy Bldg., Syracuse, N. Y.
Unger, John S., 4700 Beacon St., Chicago, Ill.
Wainright, Arthur V., 49 Wall St., New York, N. Y.

GAS CONDENSERS
Steere Engineering Co., Woodward & Horton Aves., Detroit, Mich.

GAS PLANTS
Barrett, William E., 56 Pine St., New York, N. Y.

GAS WASHING
Freyn, Brassert & Co., 122 S. Michigan Ave., Chicago, Ill.
Steere Engineering Co., Woodward & Horton Aves., Detroit, Mich.

GASOLINE EXTRACTION PLANTS
Bertsch, John C., 10 Lucerne Apts., Cor. 10th & S. Boston Sts., Tulsa, Okla.
Fink, J. B., 527 Robinson Bldg., Tulsa Okla.
Foster, Dean E., 312 S. Cincinnati Ave., Tulsa, Okla.
Hope Engineering & Supply Co., Mt. Vernon, Ohio

GASOLINE FROM NATURAL GAS
Peterson, Frank P. & Co., 535 N. Cheyenne St., Tulsa, Okla.

GEARING
Tulloss, Joseph C., 11 W. 39th St., New York, N. Y.

GEOLOGICAL (Sulphur)
Henning, John L., Lake Charles, La.

GRAIN ELEVATORS
Toltz, King & Day (Inc.), 1410 Pioneer Bldg., St. Paul, Minn.

GYPSUM PLANT
Brown, Holcombe J., 20 Beacon St., Boston, Mass.

GYROSCOPIC
Sperry, Elmer A., Manhattan Bridge Plaza, Brooklyn, N. Y.
Webster, Arthur Gordon, 85 William St., Worcester, Mass.

H

HANDLING AND PACKING MACHINERY
Neale, William McC., P. O. Box 351, Greensboro, N. C.

HARBOR IMPROVEMENTS
(See also River and Harbor Improvements)
Basinger, James Garnett, 22 William St., New York, N. Y.
Donnelly, William T., 17 Battery Place, New York, N. Y.

HEAT TREATING
Quigley, W. S., 26 Cortlandt St., New York, N. Y.
Schwab, Gustav, 4719 Ygavio Ave., Oakland, Cal.

HEATING
Duryee, Andrew B., 39 Liberty Ave., New Rochelle, N. Y.
Frans, Walter G., 1703 Union Trust Bldg., Cincinnati, Ohio
Jellett, Stewart A. Co., 1200 Locust St., Philadelphia, Pa.
Landvoigt, Thomas E., 104 Municipal Bldg., Washington, D. C.
Richmond, Knight C., 10 Weybosset St., Providence, R. I.
Stevens, John A., 8 Merrick St., Lowell, Mass.
Weber, Erwin L., 723-4 Seaboard Bldg., Seattle, Wash.

HEATING AND VENTILATING
Acheson, A. R., 601 Eckel Theatre Bldg., Syracuse, N. Y.
Allan, Charles D., 1732 S. Michigan Blvd., Chicago, Ill.
Ancona, John F., Cutler Bldg., Rochester, N. Y.
Baldwin, Wm. J., 601 World Bldg., New York, N. Y.
Ballinger Co., S. E. Cor. 12th & Chestnut, Philadelphia, Pa.
Barker, George Sands, Bridgeport, Pa.
Biggs, W. E. Engineering Co., Knoxville, Tenn.
Bolles, Frederick N., 80 Boylston St., Boston, Mass.
Bratt & Petersen, Hackensack, N. J.
Briner, E. A., 559 Central Ave., E. Orange, N. J.
Carr, E. W. (Inc.), 415-17 Gravier St., New Orleans, La.
Cary, Albert A., 95 Liberty St., New York, N. Y.
Cherry, L. A., Industrial Planning Corp'n. 80 W. Genesee St., Buffalo, N. Y.
Croney, P. Alfred, 603 Orange St., Wilmington, Del.
Dwyer, James P., Jr., 80 Boylston St., Boston, Mass.
Ehrlich, M. Wm., 96 Fifth Ave., New York, N. Y.
Ellingwood, Elliott L., 338 H. W. Hellman Bldg., Los Angeles, Cal.
Feldman, A. M., 145 W. 45th St., New York, N. Y.
Godfrey, Foskett H., 502 Provident Bldg., Tacoma, Wash.
Hickman, Charles D., Bellevue Court Bldg., Philadelphia, Pa.
Hoffman, J. D., Purdue University, Lafayette, Ind.
Hollis French & Allen Hubbard, 88 Pearl St., Boston, Mass.
Hudson, Robert A., 703 Rialto Bldg., San Francisco, Cal.
Kimball, Richard D. Co., 6 Beacon St., Boston, Mass.
Larkin & Pratt, Arcade Bldg., St. Louis, Mo.
Leland, William E., 434 Holbrook Bldg., San Francisco, Cal.
McCann, Frank G., 292 W. 92nd St., (Office) Room 515, Municipal Bldg., New York, N. Y.
McColl, Snyder & McLean, 2348 Penobscot Bldg., Detroit, Mich.
McHollan, James A., 116 E. 19th St., New York, N. Y.
MacLeod, Norman MacCallum, 47 W. Louden St., Germantown, Philadelphia, Pa.
Pillsbury, Charles L. Co., 1200 2nd Ave., S., Minneapolis, Minn.
Posey, James, 925 Fidelity Bldg., Baltimore, Md.
Richardson & Gay, 220 Devonshire St., Boston, Mass.
Richmond Engineering Co., Richmond, Va.
Riley, Champlain L., 101 Park Ave., New York, N. Y.
Schoenijahn, Robert P., Industrial Trust Bldg., Wilmington, Del.
Swoboda (Inc.), H. O., Empire Bldg., Pittsburgh, Pa.
Taylor & Downes, 801 Gaston Bldg., Dallas, Texas
Toltz, King & Day (Inc.), 1410 Pioneer Bldg., St. Paul, Minn.
Tomlinson, Malcolm C. W., 302 Bushnell Bldg., Springfield, Ohio
Wilkins, Charles N., 1307 Kerbaugh St., Philadelphia, Pa.

Digitized by Google

HEATING SYSTEMS
—Oil
Pfeffer, John E., 901 Webster Ave., Chicago, Ill.
—Vacuum
Scrivenor, Arthur, Mutual Bldg., Richmond, Va.

HOISTING
(See also Conveying)
Buckley, John H., 30 Church St., Room 1514, New York, N. Y.
Horton, John T., 242 Bradhurst Ave., New York, N. Y.

HOT WATER
Allan, Charles D., 1732 S. Michigan Blvd., Chicago, Ill.

HOTELS
Place, Clyde R., Grand Central Terminal, New York, N. Y.

HYDRAULIC
Allen, Charles M., Worcester Polytechnic Inst., Worcester, Mass.
Allen, Henry A., Room 23, 154 W. Randolph St., Chicago, Ill.
Beaubien, James A., 50 E. 42nd St., New York, N. Y.
Brown, Edward C. & Co., 220 Devonshire St., Boston, Mass.
Burr, William H., 120 Broadway, New York, N. Y.
Carver, Fred S., 8 W. 40th St., New York, N. Y.
Cooper, Hugh L., 101 Park Ave., New York, N. Y.
Cushing, Bruce L., Industrial Planning Corpn., 80 W. Genesee St., Buffalo, N. Y.
Egbert, Charles C., Gluck Bldg., Niagara Falls, N. Y.
Groat, B. F., 6327 Howe St., Pittsburgh, Pa.
Hale, Richard A., Essex Company, Lawrence, Mass.
Hill, Nicholas S., Jr., 112 E. 19th St., New York, N. Y.
Holland, Ackerman & Holland, 106 E. Liberty St., Ann Arbor, Mich.
Hornung, Geo., 512 Fairfield Ave., Bellevue, Ky.
Johnson, R. D., 60 Wall St., New York, N. Y.
Koebig, A. W., 841 Title Insurance Bldg., Los Angeles, Cal.
Landreth, Olin H., 156 5th Ave., New York N. Y.
Ledoux, J. W., 112 N. Broad St., Philadelphia, Pa.
Lee, W. S., 511 5th Ave., New York, N. Y.
Maury, Dabney H., Chicago, Ill.
Parsons, H. de B., 22 William St., New York, N. Y.
Richardson & Gay., 220 Devonshire St., Boston, Mass.
Safford, Arthur T., 66 Broadway, Lowell, Mass.
Sanderson & Porter, 52 William St., New York, N. Y.
Smith, Edward J., 30 Church St., New York, N. Y.
Spengler, Warren D., 870 Hanna Bldg., Cleveland, Ohio
Switzer, John A., University of Tennessee, Knoxville, Tenn.
Toltz, King & Day (Inc.), 1410 Pioneer Bldg., St. Paul, Minn.
Vaughan, John F., 185 Devonshire St., Boston, Mass.
Wallace, Joseph H. & Co., 5 Beekman St., New York, N. Y.
White, Gilbert C., Durham, N. C.
White, J. G. Engineering Corp'n, 43 Exchange Pl., New York, N. Y.
Whitham, Jay M., 607 Bullitt Bldg., Philadelphia, Pa.
—Machinery
Carver, Fred S., 8 W. 40th St., New York, N. Y.
Loss, Henrik V., Witherspoon Bldg., Philadelphia, Pa.
Wood, Wm. H., 10 South Ave., Media, Pa.
—Measurements
Safford, Arthur T., 66 Broadway, Lowell, Mass.

HYDRO-ELECTRIC
(See also Power Plants, Hydroelectric)
Bogart, A. L., 621 Metropolitan Life Bldg., Minneapolis, Minn.
Egbert, Charles C., Gluck Bldg., Niagara Falls, N. Y.
Rucker, B. Parks, 103 Park Ave., New York, N. Y.
—Development
Barnes, Harold B., 911 Foster Bldg., Denver, Colo.
Biggs, W. E. Engineering Co., Knoxville, Tenn.
Ferguson, Hardy S., 200 5th Ave., New York, N. Y.
Hill, Nicholas S., Jr., 112 E. 19th St., New York, N. Y.
Holland, Ackerman & Holland, 106 E. Liberty St., Ann Arbor, Mich.
Hoxie, Geo. L., San Fernando Bldg., Los Angeles, Cal.
Jackson, Dugald C., Jackson & Moreland, 387 Washington St., Boston, Mass.
Vaughan, John F., 185 Devonshire St., Boston, Mass.
—Plants
Stevens, John A., 8 Merrimack St., Lowell, Mass.

I

ICE BOATS
Bennett, Howard D., 2114 Allendale St., Baltimore, Md.

ICE MAKING PLANTS
Lewis & Watts, 501 Lewis Bldg., Portland, Ore.
Nusbaum, Lee, 1119-21 N. Howard St., Philadelphia, Pa.

ILLUMINATING
Le Page, C. B., Institute of Tech., Hoboken, N. J.
McAllister, Addams S., 248 W. 76th St., New York, N. Y.

INDUSTRIAL
Ancona, John F., Cutler Bldg., Rochester, N. Y.
Arison, Goodwin & Associates, 327 S. LaSalle St., Chicago, Ill.
Ayres, A. S., care of Meriden Brittania Co. (Ltd.), Hamilton, Ont.
Bacon, George W., Ford, Bacon & Davis, 115 Broadway, New York, N. Y.
Bartlett, D. Dana, 321 Shawmut Bank Bldg., Boston, Mass.
Batavia Service Corp'n, 29 Broadway, New York, N. Y.
Bedaux, Chas. E. Co., 4500 Euclid Ave., Cleveland, Ohio
Biggs, W. E. Engineering Co., Knoxville, Tenn.
Birnie & Hawkins, 511 5th Ave., New York, N. Y.
Brill, Geo. M., 2607 Singer Bldg., New York, N. Y.
Brown, Wendell S., 1009 Hospital Trust Bldg., Providence, R. I.
Camp, E. V., Box 421, Atlanta, Ga.

Digitized by Google

Carse, David B., International Engineering & Financing Corp'n, 111 Broadway, New York, N. Y.
Chase, Frank D. (Inc.), 645 N. Michigan Ave., Chicago, Ill.
Churchill, W. L., 103 Park Ave., New York, N. Y.
Clark, Wallace, 50 W. 12th St., New York, N. Y.
Coe, Harry L., 79 Milk St., Boston, Mass.
Conrad, W. L., 1020 Singer Bldg., New York, N. Y.
Continental Industrial Engineers (Inc.), 79 W. Monroe St., Chicago, Ill.
Cooley-Marvin Co., 15 Ashburton Pl., Boston, Mass.
Corff, Edward V., 1845 S. Spaulding Ave., Chicago, Ill.
Cravens, George W., Westfield, N. J.
Day & Zimmermann (Inc.), 611 Chestnut St., Philadelphia, Pa.
De Leeuw, A. L., 30 Church St., New York, N. Y.
Dye, Ira, 430 Lumber Exchange, Seattle, Wash.
Edgar, O. N., 616 Carter Bldg., Houston, Texas
Emerson, Harrington, 30 Church St., Now York, N. Y.
Estes, L. V. (Inc.), 202 S. State St., Chicago. Ill.
Farnham, Dwight T., 52 Vanderbilt Ave., New York City.
Firestone, Sigmund, 59-61 South Ave., Rochester, N. Y.
Fletcher, Edwin Leslie, 542 Fairfield Ave., Bridgeport, Conn.
Freyn, Brassert & Co., 122 S. Michigan Ave., Chicago, Ill.
Gerard, Graham & Co., 202 S. State St., Chicago, Ill.
Gerber, S. R., 309 Broadway, New York, N. Y.
Gillespie, Solomon E., 606 Sumpter Bldg., Dallas, Tex.
Gilmore, T. N., 136 Liberty St., New York. N. Y.
Griswold, H. J., 285 Beaver Hall Hill, Montreal, P. Q.
Gunn, Carle & Co., 444 Market St., San Francisco, Cal.
Halbfass, Arnold J., 11 Nischeweg, Berne, Switzerland
Hanks, Henry M., 441 Franklin Ave., Brooklyn, N. Y.
Harding & Orea, White Bldg., Buffalo, N. Y.
Harrison, G. Charter, 31 Nassau St., New York, N. Y.
Hastings, Glen B., First Nat'l Bank Bldg., Williamsport, Pa.
Hutchinson, Miller Reese (Inc.), 233 Broadway, New York, N. Y.
Ingham, Howard M., 140 Nassau St., New York, N. Y.
Kedy, Stiles F., 12 Pearl St., Boston, Mass.
Koch, William H., Jr., 72 W. Adams St., Chicago, Ill.
Lane, Horace H., 2320 Dime Bank Bldg., Detroit, Mich.
Larkin & Pratt, Arcade Bldg., St. Louis, Mo
Latter, Edward D., 61 Broadway, New York N. Y.
Leland, Frederic H., 14 Kilby St., Boston. Mass.
Lewis, Warren B., 740 Grosvenor Bldg., Providence. R. I.
Luehrs, Daniel M., Ellaston Bldg., Cleveland. Ohio
McCall, Brownell & Co. (Inc.), 38 W. 42nd St., New York, N. Y.
Manitus Engineering Co. (Inc.), 15 E. 40th St., New York. N. Y.
Manly & Veal, 250 W. 54th St., New York. N. Y.
Marsh, Harry B., 513 Mercantile Bldg., Evansville, Ind.
Meade, Richard K. & Co., 11 E. Fayette St., Baltimore, Md.
Meyler, R. G., 2713 Severance St., Los Angeles, Cal.
Miller, Fred J., 50 W. 12th St., New York, N. Y.
Moore, W. E. & Co., Union Bank Bldg., Pittsburgh, Pa.
Moses, Pope & Trainer (Inc.), 366 5th Ave., New York, N. Y.
Parks, Byron E. Son, 625 Michigan Trust Bldg., Grand Rapids, Mich.
Parsons, G. K. Corp'n, 96 5th Ave., New York, N. Y.
Perry, Jesse V., 1170 Broadway, New York, N. Y.
Pogue, Joseph E., 29 Fifth Ave., New York, N. Y.
Porter, Holbrook F. J., 522 5th Ave., New York, N. Y.
Randolph, L. S., Govans, Baltimore, Md.
Riley, Champlain L., 101 Park Ave., New York, N. Y.
Scott, Campbell, 132 Nassau St., New York, N. Y.
Scovell, Clinton H., 110 State St., Boston, Mass.
Scribner, Chas. F., 4046 S. Michigan Ave., Chicago, Ill.
Scrivenor, Arthur, Mutual Bldg., Richmond, Va.
Segur, A. B. & Co., 728 W. Madison St., Chicago, Ill.
Sheldon, F. P. & Son, 1009 Hospital Trust Bldg., Providence, R. I.
Shepard, George H., Purdue University, La Fayette, Ind.
Solomon, G. R., 949 Broadway, New York, N. Y.
Spengler, Warren D., 870 Hanna Bldg., Cleveland, Ohio
Sutton, Frank W., 4500 Euclid Ave., Cleveland, Ohio
Szepesi Industrial Organization, 637 Boylston St., Boston, Mass.
Taggart, James M., 1170 Broadway, New York, N. Y.
Thompson, Uldric, Jr. (Inc.), 120 Broadway, New York, N. Y.
U. S. Products Corp'n, 1423 McCormich Bldg., Chicago, Ill.
Wallace, Joseph H. & Co., 5 Beekman St., New York, N. Y.
Wellington, C. Oliver, 110 State St., Boston, Mass.
Westcott & Mapes (Inc.), 207 Orange St., New Haven, Conn.
White, J. G. Engineering Corp'n, 43 Exchange Place, New York, N. Y.
Wood, Albert C., 1203 Stock Exchange Bldg., Wynnefield, Philadelphia, Pa.
Woolson, Clifford G., 39 Cortlandt St., New York, N. Y.
Wrentmore & Reynolds, Manila, P. I.

—Buildings

Esselstyn, Murphy & Hansford, 810 Marquette Bldg., Detroit, Mich.
Roe, Walter H., Spayth Block, Tiffin, Ohio

—Cotton

Gillespie, Solomon E., 606 Sumpter Bldg., Dallas, Tex.

—Development

Basinger, James Garnett, 22 William St., New York, N. Y.

—Tractors

Kennedy, William P., 1767 Broadway, at 7th St., New York, N. Y.

INDUSTRIAL PLANTS (See also Valuation)

Batavia Service Corp'n, 29 Broadway, New York, N. Y.

Digitized by Google

INDUSTRIAL PLANTS (Continued)

Belcher, P. W., 219 Dooly Block. Salt Lake City, Utah
Brown, Edward C. & Co., 220 Devonshire St., Boston, Mass.
Cannon-Swenson Co., 53 W. Jackson Blvd., Chicago, Ill.
Ehrlich, M. Wm., 96 Fifth Ave., New York. N. Y.
Goldthwaite, Harry W., 618 Seitz Ave., Easton, Pa.
Haven, H. M. & Crosby, Wm. W., 40 Court St., Boston, Mass.
Hollis French & Allen Hubbard, 88 Pearl St., Boston, Mass.
Kent, Robert Sayre (Inc.), 50 Court St., Brooklyn, N. Y.
Koebig, A. W., 841 Title Insurance Bldg., Los Angeles, Cal.
Lane, H. M. Co., 701 Owen Bldg., Detroit, Mich.
Lockwood, Greene & Co., 60 Federal St., Boston, Mass.
McClintock & Craig, 33 Lyman St., Springfield, Mass.
Main, Charles T., 201 Devonshire St., Boston, Mass.
Manitus Engineering Co. (Inc.), 15 East 40th St., New York, N. Y.
Phelps, Frederick A., 920 Union Bldg., Newark, N. J.
Place, Clyde R., Grand Central Terminal, New York, N. Y.
Preble, Stephen E., Industrial Planning Corp'n, 80 W. Genesee St., Buffalo, N. Y.
Richardson & Gay, 220 Devonshire St., Boston, Mass.
Rothwell, C. R., 192 Broadway, New York, N. Y.
Suck, Adolph, Hyde Park Station, Boston, Mass.
Vaughan, John F., 185 Devonshire St., Boston, Mass.
Viola, Bartholomew, 309 Broadway, New York, N. Y.
Woodwell, J. E., 501 Fifth Ave., New York, N. Y.

—Designing

Adler, Alphonse A., 9 Murray St., New York, N. Y.
De Leeuw, A. L., 30 Church St., New York, N. Y.

INDUSTRIAL RELATIONS

Calder, John, 19 Goodwin Rd., Lexington, Mass.

INLAND WATERWAYS

Bixby, William H., 1709 Lanier Place, N. W., Washington, D. C.
Donnelly, William T., 17 Battery Place, New York, N. Y.
Massey, Geo. B. Co., Peoples Gas Bldg., Chicago, Ill.

INSPECTION

Bedaux, Chas. E. Co., 4500 Euclid Ave., Cleveland, Ohio
Colwell, James V. V., 105 W. 40th St., New York, N. Y.
Conard, William R., 322 High St., Burlington, N. J.
Gebbardt, G. F., Armour Inst. of Tech., Chicago, Ill.
Lea, E. S., 229 Chestnut Ave., Trenton, N. J.
Lovell, Alfred, 619 Harrison Bldg., Philadelphia, Pa.
Manly & Veal, 250 W. 54th St., New York, N. Y.
Pacific Northwest Inspection Bureau, 236 Burke Bldg., Seattle, Wash.

INSULATING MATERIALS

Pike, Robert D., 74 New Montgomery St., San Francisco, Cal.
Quigley, W. S., 26 Cortlandt St., New York, N. Y.

INTERCHANGEABLE PARTS

Modern Engineering Co., 318 Broadway, New York, N. Y.

INVENTIONS

Hutchison, Miller Reese, 233 Broadway, New York, N. Y.
Marshall, Norman, Waltham, Mass.
Neale, William McC., P. O. Box 351, Greensboro, N. C.

—Development

Abbott, W. G., Jr., Wilton, N. H.
Batavia Service Corp'n, 29 Broadway, New York, N. Y.
Bentley & Holmgren, 406 Court Exchange Bldg., Bridgeport, Conn.
Broome, Ernest L., 49 Wall St., New York, N. Y.
Fassett, Francis K., 1302-1303 U. B. Bldg., Dayton, Ohio
Hutchinson, Miller Reese (Inc.), 233 Broadway, New York, N. Y.
Kaighn, Herbert E., 3143-45 Dupont Bldg., Wilmington, Del.
Roe, Walter H., Spayth Block, Tiffin, Ohio
Sessions, Frank L., 422 Kirby Bldg., Cleveland, Ohio
Soben, Adolph F., 238-9-10 San Fernando Bldg., Los Angeles, Cal.

INVESTIGATIONS (See also Examinations and Reports)

Allison, James E. & Co., 1017 Olive St., St. Louis, Mo.
Arison, Goodwin and Associates, 327 So. La Salle St., Chicago, Ill.
Brill, Geo. M., 2607 Singer Bldg., New York, N. Y.
Cary, Albert A., 95 Liberty St., New York. N. Y.
Collins, Hubert, E. 132 Boyce Ave., Utica, N. Y.
Davis, Charles Ethan, Box 133, Engineers' Club, New York, N. Y.
Dowd Engineering Co., 131 West 39th St., New York, N. Y.
Fassett, Francis K., 1302-1303 U. B. Bldg., Dayton, Ohio
Hickman, Charles D., Bellevue Court Bldg., Philadelphia, Pa.
Hubbard, Harris & Rowell (Inc.), 1047 Broad St., Bridgeport, Conn.
Kennedy, William P., 1767 Broadway at 57th St., New York, N. Y.
Lewis & Watts, 501 Lewis Bldg., Portland, Oregon
Perkins, George H., 184 Batterymarch St., Boston, Mass.
Railway & Industrial Engineers (Inc.), 25 Broad St., New York, N. Y.

INVESTIGATIONS AND REPORTS

Arison, Goodwin and Associates, 327 So. La Salle St., Chicago, Ill.
Bartlett, D. Dana, 321 Shawmut Bank Bldg., Boston, Mass.
Bedaux, Chas. E. Co., 4500 Euclid Ave., Cleveland, Ohio
Crowell, Henry W., Room 1026 Kinney Bldg., Newark, N. J.
Manly & Veal, 250 W. 54th St., New York, N. Y.
Murrie & Co. (Inc.), 74 Broadway, New York, N. Y.
Myers, David Moffat, Griggs & Myers, 347 Fifth Ave., New York, N. Y.
Sutton, Frank W., 4500 Euclid Ave., Cleveland, Ohio
Swoboda (Inc.), H. O., Empire Bldbg., Pittsburgh, Pa.

IRON FOUNDRY

Moore, Edwin A., Foot of Robeson St., Reading, Pa.

Digitized by Google

IRRIGATION (See also Drainage)
Koebig, A. W., 841 Title Insurance Bldg., Los Angeles, Cal.
Wright, William Q., 210 Merchants Exchange Bldg., San Francisco, Cal.

J

JIGS AND FIXTURES
Dowd Engineering Co., 131 West 39th St., New York, N. Y.
Walter Engineering Co., 216 Ludlow Bldg., Dayton, Ohio
—Design
De Leeuw, A. L., 30 Church St., New York, N. Y.

K

KILNS
—Lime
Fuller Engineering Co., Allentown, Pa.
Meade, Richard K. & Co., 11 E. Fayette St., Baltimore, Md.
—Revivifying
Kent, Robert Sayre (Inc.), 50 Court St., Brooklyn, N. Y.
—Rotary
Fuller Engineering Co., Allentown, Pa.
Kent, Robert Sayre (Inc.), 50 Court St., Brooklyn, N. Y.
—Stationary
Kent, Robert Sayre (Inc.), 50 Court St., Brooklyn, N. Y.

L

LABORATORY RESEARCH DEVELOPMENT
Hatch, Edwin G., 220 Broadway, New York, N. Y.

LAND RECLAMATION (See also Drainage and Reclamation)
Bennett, Howard D., 2114 Allendale St., Baltimore, Md.
Massey, Geo. B. Co., Peoples Gas Bldg., Chicago, Ill.
Wright, William Q., 210 Merchants Exchange Bldg., San Francisco, Cal.

LAYOUT (See also Factories)
—Factory
Peet, Edwin B., 6 North 21st St., E. Orange, N. J.
—Plant
Brown, John Wilson, Jr., 1213 Filbert St., Philadelphia, Pa.

LEAD-LINED APPARATUS
Viola, Bartholomew, 309 Broadway, New York, N. Y.

LIGHTING
MacLeod, Norman MacCallum, 47 W. Louden St., Germantown, Philadelphia, Pa.
Posey, James, 925 Fidelity Bldg., Baltimore, Md.
Richardson & Gay, 220 Devonshire St., Boston, Mass.
Stevens, John A., 8 Merrimack St., Lowell, Mass.

LUBRICATION
Engineering & Commerce Corpn., 461 8th Ave., New York, N. Y.
Fish, Charles H., 73 Tremont St., Boston, Mass.
Parish, William F., 336 West Madison St., Chicago, Ill.

LUMBER MILLS
Graham, John L., Reynoldsville, Pa.
Lewis & Watts, 501 Lewis Bldg., Portland, Ore.

M

MACHINE, DEVELOPMENT
Soben, Adolph F., 238-9-10 San Fernando Bldg., Los Angeles, Cal.

MACHINE SHOP PRACTICE
Scott, Walter Glenn, 52 Vanderbilt Ave., New York, N. Y.

MACHINE TOOLS
Blood, L. H., Union Central Bldg., Cincinnati, Ohio

MACHINERY OR MACHINES (See Appraisals, Automatic, Chocolate Making, Cotton Seed Crushing, Electric, Forging, Handling and Packing, Hydraulic, Special, Sugar, Testing Textile, Wood Working.)

MACHINERY DESIGNING
Adler, Alphonse A., 9 Murray St., New York, N. Y.
Batavia Service Corp'n, 29 Broadway, New York, N. Y.
Blatchford, John, 333 N. Euclid Ave., Oak Park, Ill.
Brown, Herman E., 342 Madison Ave., New York, N. Y.
Brown, John Wilson, Jr., 1213 Filbert St., Philadelphia, Pa.
Buch-Groff Co. (Inc.), 233 Broadway, New York, N. Y.
Carpenter, George D., 903 E. State St., Ithaca, N. Y.
Cooley & Marvin Co., 15 Ashburton Place, Boston, Mass.
Corff, Edward V., 1845 South Spaulding Ave., Chicago, Ill.
Cummings, Henry H., 110 High St., Boston, Mass.
Cundall, Robert N., Industrial Planning Corp'n, 80 W. Genesee St., Buffalo, N. Y.
De Leew, A. L., 30 Church St., New York, N. Y.
Dodge, Adiel Y., Room 214 Badger Bldg., Racine, Wis.
Dowd Engineering Co., 131 West 39th St., New York, N. Y.
Fassett, Francis K., 1302-1303 U. B. Bldg., Dayton, Ohio
Fermier, E. J., College Station, Texas
Fish, Charles H., 73 Tremont St., Boston, Mass.
Furman, F. De. R., Stevens Inst. of Tech., Hoboken, N. J.
Gooding, Charles, 27 School St., Boston, Mass.
Harris, Ford W., 933 Higgins Bldg., Los Angeles, Cal.
Hill, Herbert M., 301 Lexington Ave., New York, N. Y.
Hubbard, Harris & Rowell (Inc.), 1047 Broad St., Bridgeport, Conn.
Manitus Engineering Co. (Inc.), 15 East 40th St., New York, N. Y.
Mayo, Edward H., 412 Traction Terminal Bldg., Indianapolis, Ind.
Modern Engineering Co., 318 Broadway, New York, N. Y.
Neale, William McC., P. O. Box 351, Greensboro, N. C.
Newell, W. L., 1017 Alaska Bldg., Seattle, Wash.
New Era Machinery Designing Co., 215 Parkway Bldg., Philadelphia, Pa.
Norden, Carl L., 375 Fulton St., Brooklyn, N. Y.
Oswald, H. A., Hamilton Motors Co., Grand Haven, Mich.
Penny, Harold D., 9 Murray St., New York, N. Y.
Rautenstrauch, Walter, 43 Exchange Place, New York, N. Y.
Scrievenor, Arthur, Mutual Bldg., Richmond, Va.
Shaw, Louis E., 179 N. Parkway, East Orange, N. J.

Digitized by Google

MACHINERY DESIGNING (Continued)

Sintz, Claude, 614 First St., Detroit, Mich.
Sitney, Massey, 1880 East 14th St., Brooklyn, N. Y.
Sullivan, William L., P. O. Box 1224, Tulsa, Okla.
Wite, Lorenzo E., 430 Elder Drive, Toledo, Ohio
Walter Engineering Co., 216 Ludlow Bldg., Dayton, Ohio
Wunsch & Washburn, 302-304 McDougal St., Brooklyn, N. Y.

MAGNESITE PRODUCTS

Pike, Robert D., 74 New Montgomery St., San Francisco, Cal.

MANAGEMENT (See also Factories, Power Plants, Public Utilities, Shop)

Arison, Goodwin and Associates, 327 So. La Salle St., Chicago, Ill.
Baker, Wm. H., 120 Broadway, New York, N. Y.
Bayne, C. William, 15 E. Hartford St., Muskegon, Mich.
Bedaux, Chas. E. Co., 4500 Euclid Ave., Cleveland, Ohio
Benedict, Howard G., 2269 Grandview Ave., Cleveland, Ohio
Brill. Geo. M.,, 2607 Singer Bldg., New York, N. Y.
Calder, John, 19 Goodwin Rd., Lexington, Mass.
Carpenter, George D., 903 E. State St., Ithaca, N. Y.
Carse, David B., International Engrg. & Financing Corp., 111 Broadway, New York, N. Y.
Churchill, W. L., 103 Park Ave., New York, N. Y.
Clark, Wallace, 50 West 12th St., New York, N. Y.
Colwell, James V. V., 105 W. 40th St., New York. N. Y.
Cooke, Morris, Llewellyn, 401 W. Walnut Lane, Germantown, Philadelphia, Pa.
Cooley-Marvin Co., 15 Ashburton Place, Boston, Mass.
Corff, Edward V., 1845 South Spaulding Ave., Chicago, Ill.
Curtis. Walter M., 141 Firglade Ave., Springfield, Mass.
Davis, Charles Ethan, Box 133, Engineers' Club, New York, N. Y.
Emerson, Harrington, 30 Church St., New York, N. Y.
Feiss, Richard A., 2149 W. 53rd St., Cleveland, Ohio
Fleming, Henry S., 1 Broadway, New York, N. Y.
Gantt, H. L., Corpn., 2905 Singer Bldg., New York, N. Y.
Gerard, Graham & Co., 202 S. State St., Chicago, Ill.
Gilbreth, Frank B. (Inc.), 68 Eagle Rock Way, Montclair, N. J.
Hall, Keppele, 1109 Finance Bldg., S. Penn Sq., Philadelphia, Pa.
Hannah, Frederick A., 32 W. 40th St., New York, N. Y.
Hathaway, H. K., Finance Bldg., S. Penn Sq., Philadelphia, Pa.
Industrial Engineers Corpn., Suite 920 Victoria Bldg., St. Louis, Mo.
Ingham. Howard M., 140 Nassau St., New York, N. Y.
Keely, Royal R., c-o. Macoy, 45 John St., New York, N. Y.
Kraemer, Milton, 515-517 Rialto Bldg., San Francisco, Cal.
McCall, Brownell & Co. (Inc.), 33 West 42d St., New York, N. Y.
Merrick, Dwight V., 34 Gramercy Park, New York, N. Y.
Moses, Pope & Trainer (Inc.), 366 Fifth Ave., New York, N. Y.
Oswald, H. A., Hamilton Motors Co., Grand Haven, Mich.
Polakov, Walter N. & Co. (Inc.), 33 West 42nd St., New York, N. Y.
Radford, G. S., c-o. Halstead Specialties Co., 503 Market St., San Francisco, Cal.
Railway & Industrial Engrs. (Inc.), 25 Broad St., New York, N. Y.
Rautenstrauch, Walter, 43 Exchange Place, New York, N. Y.
Scott, Walter Glenn, 52 Vanderbilt Ave., New York, N. Y.
Scovell, Wellington & Co., 110 State St., Boston, Mass.
Shepard, George H., Purdue University, La Fayette, Ind.
Spackman, Henry S., 2024 Arch St., Philadelphia, Pa.
Sullivan, William L., P. O. Box 1224, Tulsa, Okla.
Sutton, Frank W., 4500 Euclid Ave., Cleveland, Ohio
Thompson & Lichtner Co., 136 Federal St., Boston, Mass.
Waldren, Frederick A., Edward Van Winkle, 37 Wall St., New York, N. Y.
Wilderman, Rudolf, 160 5th Ave., New York, N. Y.
Wolf, Robert B., 33 W. 42nd St., New York, N. Y.

—Industrial

Sanderson & Porter, 52 William St., New York, N. Y.

MANUFACTURE

(See Aeronautical Motors, Automobile, Machine Tools, Optical Glass, Time Fuse)

MANUFACTURING METHODS

Davis, Charles Ethan, Box 133, Engineers' Club, New York, N. Y.
Hubbard, Harris & Rowell (Inc.), 1047 Broad St., Bridgeport, Conn.
Manly & Veal, 250 W. 54th St., New York, N. Y.
Rautenstrauch, Walter, 43 Exchange Place, New York, N. Y.
Roe, Walter H., Spayth Block, Tiffin, Ohio

MANUFACTURING PROCESSES

Abbott, W. G., Jr., Wilton, N. H.
Hanks, Henry M., 441 Franklin Ave., Brooklyn, N. Y.
Sessions, Frank L., 422 Kirby Bldg., Cleveland, Ohio

—Textile

Cox, Jr., James W., 320 Broadway, New York, N. Y.

MARINE

(See also Concrete Ships, Fire Boats, Ice Boats, Naval)

Bennett, Howard D., 2114 Allendale St., Baltimore, Md.
Bratt & Peterson, Hackensack, N. J.
Fryer, Ross L., 817-818 Albee Bldg., Washington, D. C.
Hardesty, Frederick S., Commercial Natl. Bank Bldg., Washington, D. C.
Lovell, Ralph L., 90 West St., New York, N. Y.
Matthews, John B., 24 California St., San Francisco, Cal.

MARINE SURVEYING

Bratt & Peterson, Hackensack, N. J.
Wilson, James A., 2-4 Stone St., New York, N. Y.

MARINE TERMINALS

Bennett, Howard D., 2114 Allendale St., Baltimore, Md.

MARINE TRANSPORTATION

Donnelly, William T., 17 Battery Place, New York, N. Y.

Digitized by Google

MATERIAL HANDLING EQUIPMENT
Dunscomb, W. S., Twinsburg, Ohio

MATHEMATICS
Gunther, Charles O., Stevens Institute of Technology, P. O. Box 77, Hoboken, N. J.

MEAT PACKING PLANTS
Batavia Service Corpn., 29 Broadway, New York, N. Y.

MECHANICAL
Acheson, A. E., 601 Eckel Theatre Bldg., Syracuse, N. Y.
Adams, Edward T., 1409 Crenshaw Blvd., Los Angeles, Cal.
Adams, Henry, 33 West 39th St., New York, N. Y.
Adler, Alphonse A., 9 Murray St., New York, N. Y.
Allan, Charles D., 1732 S. Michigan Blvd., Chicago, Ill.
Allen, Albert M., 7016 Euclid Ave., Cleveland, Ohio
Allen, Henry A., Room 23, 154 West Randolph St., Chicago, Ill.
Allen, Thos. H. 510 Bank of Commerce Bldg., Memphis, Tenn.
Allen, W. D., 951 Stuart Bldg., Seattle, Wash.
American Industrial Engrg. Co., Monadnock Block, Chicago, Ill.
Ancona, John F., Cutler Bldg., Rochester, N. Y.
Anderson, A. C., 524-6 Bee Bldg., Omaha, Neb.
Anderson, F. Paul, Dean College of Engrg., University of Kentucky, Lexington, Ky.
Arispe, Emilio, Apartado 66, Saltillo, Coah, Mexico.
Ashley, Frank M., 154 Nassau St., New York, N. Y.
Baker, C. T., 821 Candler Bld., Atlanta, Ga.
Baker, Walter C., 515 Standard Parts Bldg., Cleveland, Ohio
Baker, Wm. H., 120 Broadway, New York, N. Y.
Balch, Samuel W., 160 Broadway, New York, N. Y.
Baldwin, Bert L., 1201-4 Second Natl. Bank Bldg., Cincinnati, Ohio
Ballinger Co., S. E. Cor. 12th & Chestnut, Philadelphia, Pa.
Barber, Clarence M., 161 Blaine Ave., Detroit, Mich.
Barkelew, James T., 911 Central Bldg., Los Angeles, Cal.
Barker, George Sands, Bridgeport, Pa.
Barkley, F. W., 220 Devonshire St., Boston, Mass.
Barlow, Frederic C., Portland, Oregon
Barnaby, Chas. W., 257 Hamilton Ave., New Brighton, Staten Island, N. Y.
Barnes, Harold B., 911 Foster Bldg., Denver, Colo.
Barnes, William O., 770 Main St., Leominster, Mass.
Barthel, Oliver E., 802 Moffat Bldg., Detroit, Mich.
Batavia Service Corpn., 29 Broadway, New York, N. Y.
Battle, J. R. Co., Otis Bldg., Philadelphia, Pa.
Baum, Frank G., 1901-2 Hobart Bldg., San Francisco, Cal.
Baxter, B. M., 5716 Euclid Ave., Cleveland, Ohio
Bayne, C. William, 15 E. Hartford St., Muskegon, Mich.
Bedaux, Chas. E. Co., 4500 Euclid Ave., Cleveland, Ohio
Behr, H. C., 2 Rector St., New York, N. Y.
Beitman, A. H., 296 Broadway, New York, N. Y.
Belcher, P. W., 219 Dooly Block, Salt Lake City, Utah.
Bell, John E., 111 Broadway, New York, N. Y.
Benedict, Howard G., 2269 Grandview Ave., Cleveland, Ohio
Bennett, Howard D., 2114 Allendale St., Baltimore, Md.
Bensel, John A., Bernardsville, N. J.
Benster, Halsey, 1608 2nd St., East Moline, Ill.
Beranger, Jos. P., West India Sugar Finance Corp., 129 Front St., New York, N. Y.
Berg, Christian P., 10 S. La Salle St., Chicago, Ill.
Bernner, Milton St. John, 46 Whitney Ave., Elmhurst, L. I., N. Y.
Berry, A. O., 108 W. 6th St., Chattanooga, Tenn.
Bertsch, John C., 10 Lucerne Apts., Cor. 10th & S. Boston Sts., Tulsa, Oklahoma
Bewley, William E., Room 1107, 165 Broadway, New York, N. Y.
Bierbaum, Christopher H., 1011 Mutual Life Bldg., Buffalo, N. Y.
Biggs, W. E. Engineering Co., Knoxville, Tenn.
Blackwood, Jos. H., 528 Woodward Bldg., Washington, D. C.
Blatchford, John, 333 N. Euclid Ave., Oak Park, Ill.
Blatchley, Chas. A., 1600 Arch St., Philadelphia, Pa.
Blee, Harry H., San Juan Capistrano, Cal.
Block, Louis, 501 Fifth Ave., New York, N. Y.
Blood, L. H., 2904 Union Central Bldg., Cincinnati, Ohio
Bogart, A. L., 72 W. Minnehaha Parkway Minneapolis, Minn.
Bolles, Frederick N., 80 Boylston St., Boston, Mass.
Bonine, Charles E., 20 S. 15th St., Philadelphia, Pa.
Bosch, Fred. William, 30 North 30th St., Camden, N. J.
Powers, George W., 53 Devonshire St., Boston, Mass.
Boyd, John T., 149 E. 40th St., New York, N. Y.
Bradt. Morris, 1121 Holston Bank Bldg., Knoxville, Tenn.
Bratt & Petersen, Hackensack, N. J.
Brett, Henry E., 533 Higgins Bldg., Los Angeles, Cal.
Brewster, Henry B., 613 Dillaye Bldg., Syracuse, N. Y.
Brightman, Howard L., care Brightman Mfg. Co., South Columbus, Ohio
Brill, Geo. M., 2607 Singer Bldg., New York, N. Y.
Briner, E. A., 559 Central Ave., E. Orange, N. J.
Broom, Benj. A., 510 Security Bk., Bldg., Sioux City, Iowa
Broome, Ernest L., 49 Wall St., New York, N. Y.
Brossman, Chas., 1503 Merchants Bank Bldg., Indianapolis, Ind.
Brown, Edward C. & Co., 220 Devonshire St., Boston, Mass.
Brown, Henry A., 2768 Delaware Ave., Buffalo, N. Y.
Brown, Herman E., 342 Madison Ave., New York, N. Y.
Brown, John Wilson, Jr., 1213 Filbert St., Philadelphia, Pa.
Bruff, Charles E., 85 Second St., San Francisco, Cal.
Brush, Alanson P., 714-15 Kresge Bldg., Detroit, Mich.
Buckley, John H., 30 Church St., Room 1514, New York, N. Y.
Bulkeley, Claude A., 1313 W. 8th St., Wilmington, Del.

Digitized by Google

MECHANICAL (Continued)

Bunnell, Sterling H., 103 Park Ave., New York, N. Y.
Burnet, Edgar E., Lincoln, Cal.
Burns & McDonnell, 402 Interstate Bldg., Kansas City, Mo.
Butler, Jas. A., Old South Bldg., Boston, Mass.
Calder, John, 19 Goodwin Rd., Lexington, Mass.
Cannon-Swenson Co., 54 W. Jackson Blvd., Chicago, Ill.
Caracristi, V. Z., 43 Broad St., New York.
Carey, James L., 208 N. Laramie Ave., Chicago, Ill.
Carpenter, Charles Irving, 618 Rookery Bldg., Spokane, Wash.
Carpenter, George D., 903 E. State St., Ithaca, N. Y.
Carr, E. W. (Inc.), 415-17 Gravier St., New Orleans, La.
Carter, Henry W., 1425-7 Monadnock Bldg., Chicago, Ill.
Carver, Fred. S., 8 West 40th St., New York, N. Y.
Cary, Albert A., 95 Liberty St., New York, N. Y.
Casler, Frank W., 455 Mt. Prospect Ave., Newark, N. J.
Cetrule, John, 18 East 41st St., New York, N. Y.
Chadwick & Bendit, 517 Finance Bldg., Kansas City, Mo.
Chandler, R. E., Moscow, Idaho
Charter, James A., 1438 East 65th St., Chicago, Ill.
Chase, Nathaniel S., 49 Bordon Block, Fall River, Mass.
Chatard, Wm. M., 304 Continental Bldg., Baltimore, Md.
Christian, Joseph D., 57 First St., San Francisco, Cal.
Christie, A. G., Johns Hopkins University, Baltimore, Md.
Church, Elihu C., 4 East 130th St., New York, N. Y.
Cleaton Co. (Ltd.), 128 Bleury St., Montreal, Canada
Cleghorn, M. P., 518 Ash Ave., Ames, Iowa
Colby, Albert Ladd, Brighton St., Bethlehem, Pa.
Cole, Frank B., Box 563, Newnan, Ga.
Colles, George Wetmore, 1112½ Preston Ave., Houston, Tex.
Collins, Francis W., 50 Church St., New York, N. Y.
Collins, Hubert E., 132 Boyce Ave., Utica, N. Y.
Comstock, Charles Worthington, First Natl. Bank Bldg., Denver, Colo.
Conant, Wm. S., 508 Griswold St., Detroit, Mich.
Conard, William R., 322 High St., Burlington, N. J.
Combs, Howard A., McLachlen Bldg., 700 10th St., Washington, D. C.
Corff, Edward V., 1845 South Spaulding Ave., Chicago, Ill.
Cory, Harry Thomas, 2717 Benvenue Ave., Berkeley, Cal.
Cory, Russell G., 50 Church St., New York, N. Y.
Cox, James W. Jr., 320 Broadway, New York, N. Y.
Craig, Charles H., Jr., 33 Lyman St., Springfield, Mass.
Cravens, George W., Westfield, N. J.
Croney, P. Alfred, 603 Orange St., Wilmington, Del.
Cummings, Henry H., 110 High St., Boston Mass.
Cummings, W. W., 15 Winter St., Woburn, Mass.
Curtis, Walter M., 141 Firglade Ave., Springfield, Mass.
Dalley, A. H. Charles, 801-122 S. Michigan Ave., Chicago, Ill.
Daniel, Thomas L., 4657 Aldrich Ave., S., Minneapolis, Minn.
Darby, John, 7 E. 42nd St., New York, N. Y.
Davis, Charles Ethan, Box 133, Engineers' Club, New York, N. Y.
Davis, Charles Henry, Bass River, Mass.
Davol, Geo. K., 503 Market St., San Francisco, Cal.
Deerben Engineering Associates, 70 Kilby Street, Boston, Mass.
De Lancey, Darragh, 52 Pine St., Waterbury, Conn.
Denk, F. T., 45-46 Shannon Bldg., Pittsburgh, Pa.
Denny, Omer, 58 Sutter St., San Francisco, Cal.
Deverell, Spencer & Co. (Inc.), 514-517 Garrett Bldg., Baltimore, Md.
Diemoulding Production Co. (Inc.), Canastota, N. Y.
Dobson, Wm. J. M., Red Lodge, P. O. Box 955, Montana
Dock, Herman Engineers' Club, New York, N. Y.
Dodge, Adiel Y., Room 214. Badger Bldg., Racine, Wis.
Dodge, Kern, State Road & Hellerman St., Tacony, Philadelphia, Pa.
Dollar, W. M., 58 Dun Bldg., Buffalo, N. Y.
Donnelly, William T., 17 Battery Place, New York, N. Y.
Dorward, David, Jr., 16 California St., San Francisco, Cal.
Dowd Engineering Co., 131 West 39th St., New York, N. Y.
Dowd, Wyllys, E., Jr., 111 Broadway, New York, N. Y.
Downes, Nate W., 301 Gaston Bldg., Dallas, Tex.
Dreyfus, Edwin D., 807 West Penn Bldg., Pittsburgh, Pa
Ducas, Charles, 206 Broadway, New York, N. Y.
Duncan, Harry L., Rooms 2407-2408, 55 Liberty St., New York, N. Y.
Dunscomb, W. S., Twinsburg, Ohio
Durr, H. A. & Co., 123 W. Madison St., Chicago, Ill.
Duryee, Andrew B., 39 Liberty Ave., New Rochelle, N. Y.
Dwyer, James P., Jr., 80 Boyleston St., Boston, Mass.
Dyer Co., 2031 Euclid Ave., Cleveland, Ohio
Dyer, William J., 3005 Claremont Ave., Berkeley, Cal.
Eadie, Freund & Campbell, 7 W. 45th St., New York, N. Y.
Eager, W. G., Valdosta, Ga.
Egbert, Charles C., Gluck Bldg., Niagara Falls, N Y
Ehrlich, M. Wm., 96 Fifth Ave., New York, N. Y.
Eickhoff, Theodore H., 5716 Euclid Ave., Cleveland, Ohio
Ellingwood, Elliott L., 338 H. W. Hellman Bldg., Los Angeles, Cal.
Ellis, Frank I., Farmers Bank, Bldg., Pittsburg, Pa.
Ellison, Lewis M., 214 W. Kinzie St., Chicago, Ill.
Elrod, Henry E., Dallas, Texas
Emery, A. H., Glenbrook, Conn.
Engineering & Commerce Corpn., 461 8th Ave., New York, N. Y.
Engineering Sales Co. (Inc.), New Orleans, La
Ericson, John E., 820 Otis Bldg., Chicago, Ill.
Esselstyn, Murphy & Hanford, 810 Marquette Bldg., Detroit, Mich.

Digitized by Google

Ettenger, Robert L., 1300 Pennsylvania Ave., Washington, D. C.
Farmer, John T., 314 Coristine Bldg., Montreal, Quebec.
Fassett, Francis K., 1302-1303 U. B. Bldg., Dayton, Ohio.
Federal Engineering Co., 588 Drexel Bldg., Philadelphia, Pa.
Feldman, A. M., 145 W. 45th St., New York, N. Y.
Fergus, William L. & Co., 1509 Fisher Bldg., Chicago, Ill.
Ferguson, Smith F., 112 E. 19th St., New York, N. Y.
Fermier, E. J., College Station, Texas
Fernald, R. H., University of Pa., Philadelphia, Pa.
Fickes, Alfred C., 547 W. Chestnut St., Lancaster, Pa.
Field, J. A., 1859 Mannering Road, Cleveland, Ohio
Fillingham, Myles P., 50 Church St., New York, N. Y.
Findlay, W. D., Room 902, 141 Milk St., Boston, Mass.
Finkle, Frederick C., 448-449 L. W. Hellman Bldg., Los Angeles, Cal.
Fish, Charles H., 73 Tremont St., Boston Mass.
Fitch, Claude E., 1033 Elmwood Ave., Wilmette, Ill.
Flack, Alonzo, 317 William St., East Orange, N. J.
Flather, John J., 315 Eleventh Ave., S. E., Minneapolis, Minn.
Forbes, W. D., 236 Hempstead St., New London, Conn.
Fournier, Thomas F., P. O. Box 1201, Providence, R. I.
Fowler, Geo. L., 114 Liberty St., New York, N. Y.
Franklin, E. J., Box 878, Hayden, Arizona
Franz, Walter G., 1703 Union Trust Bldg., Cincinnati, Ohio
Fraser, John, 30 Church St., New York, N. Y.
Freedley, Paul, 615 Witherspoon Bldg., Philadelphia, Pa.
Freeman, Wm. J., 1745 Conway Bldg., Chicago, Ill.
Freyn, Brassert & Co., 122 S. Michigan Ave., Chicago, Ill.
Frick, John, 701 Denckla Bldg., Philadelphia, Pa.
Frobrieb, Louis C., 1116 House Bldg., Pittsburgh, Pa.
Fryer, Ross L., 817 Albee Bldg., Washington, D. C.
Fuel Engineering Co. of N. Y. 106 E. 19th St., New York, N. Y.
Fuller Engineering Co., Allentown, Pa.
Funk, Nelson E., 150 Nassau St., New York, N. Y.
Furguson, Smith F., 112 East 19th St., New York, N. Y.
Furman, F. De R., Stevens Inst. of Tech., Hoboken, N. J.
Gage-Engineering Service Co., 1410 H St., N. W., Washington, D. C.
Gains, Frederic F., 16th & Irving Sts., Washington, D. C.
Gant, H. P., Land Title Bldg., Philadelphia, Pa.
Gardner & Lindberg, 1135 Marquette Bldg., Chicago, Ill.
Gardner, Thomas M., 814 E. 23rd St., Indianapolis, Ind.
Garland, C. M., 1140 First National Bank Bldg., Chicago, Ill.
Gassman, Howard M., 848-9 Brown Marx Bldg., Birmingham, Ala.
Gates, S. J., 69 Wisconsin St., Milwaukee, Wis
Gearing, H., 633-5 Wesley Roberts Bldg., Los Angeles, Cal.
Gebhardt, G. F., Armour Inst. of Tech., Chicago, Ill.
Gerard, Graham & Co., 202 S. State St., Chicago, Ill.
Gerber, Samuel R., 309 Broadway, Brooklyn, N. Y.
Gibbs, Harold E., 806 Niagara Life Bldg., Buffalo, N. Y.
Gibson, Geo. H. Co., 100 Gold St., New York, N. Y.
Gillespie, Solomon E., 606 Sumpter Bldg., Dallas, Tex.
Ginter, Geo. E., 506 Calcasieu Bldg., San Antonio, Tex.
Givan, Albert, 1525 K St., Sacramento, Cal.
Godfrey, Foskett H., 502 Provident Bldg., Tacoma, Wash.
Goldie & McCullough Co. (Inc.), Galt, Ont. Canada
Goldschmidt, Otto E., 116 W. 39th St., New York, N. Y.
Goldthwaite, Harry W., 618 Seitz Ave., Easton, Pa.
Gorham, Wm. R., 53 Aza Kominato, Kitadate Machi, Junction, Yokohama, Japan.
Goss, Harry T., 48 New Chambers St., New York, N. Y.
Goubert, Aug. A., 90 West St., New York, N. Y.
Graham, John L., Reynoldsville, Pa.
Gray, James H., 71 Broadway, New York, N. Y.
Gray, John R., 686 Howard St., San Francisco, Cal.
Green, Samuel M. Co., Springfield, Mass.
Greenwood, T. T., 40 Court St., Boston Mass.
Grissinger, Elwood, 293 Lexington Ave., Buffalo, N. Y.
Grohmann, Carl L., 21 Beverly Rd., Hartford, Conn.
Grossman, Albert, 112 Marlborough Rd., Brooklyn, N. Y.
Gunn, Carle & Co., 444 Market St., San Francisco, Cal.
Gunther, Charles O., Stevens Institute of Technology, P. O. Box 77, Hoboken, N. J.
Guthrie, James, 1313 Engineers Bldg., Cleveland, Ohio
Hahn, Conrad V., P. O. Box 4039, Philadelphia, Pa.
Halbfass, Arnold J., 11 Nischeweg, Berne, Switzerland
Hamilton, James, Ouray Bldg., 8th & G Sts., Northwest, Washington, D. C.
Hamilton, John W., 29 Broadway, New York, N. Y.
Hammer, Charles T., 35 Nassau St., New York, N. Y.
Hammer, Edwin W., 160 Broadway, New York, N. Y.
Hannah, Frederick A., 32 W. 40th St., New York, N. Y.
Hanscom, William Wallace, 848 Clayton St., San Francisco, Cal.
Hanzlik, Henry J. Wellsville N. Y.
Hardesty, Frederick S., Commercial Natl. Bank Bldg., Washington, D. C.
Hardy, Clement A. .Room 654 Railway Exchange Bldg., Chicago, Ill.
Harris, Ford W., 933 Higgins Bldg., Los Angeles, Cal.
Harris, Grenville A., Room 2914 Woolworth Bldg., New York, N. Y.
Hartshonre, William D., 40 Pleasant St., Methuen, Mass.
Hastings, Glen B., First Natl. Bank Bldg., Williamsport, Pa.
Hatfield, Robert L., 207 Market St., Newark, N. J.
Haven, H. M. & Crosby, Wm. W., 40 Court St., Boston, Mass.
Hay, Paul L., 1406 Keenan Bldg., Pittsburgh, Pa.

Digitized by Google

MECHANICAL (Continued)

Haynes, Hasbrouk, Haynes Corpn., First National Bank Bldg., Chicago, Ill.
Hayward, H. W., Mass. Inst. Tech., Cambridge, Mass.
Hefner & Maysilles, Grafton, W. Va.
Henderson, Geo. R., 1920 Chestnut St., Philadelphia, Pa.
Fenney, David H., 55 Liberty St., New York N. Y.
Henry, William T., P. O. Box 152, Fall River, Mass
Henshaw, Frederick V., 25 Nassau St., New York, N. Y.
Herrick, Carl A., 3816 Thomas Ave., S., Minneapolis, Minn.
Hessenbruch, George S., Suite 920 Victoria Bldg., St. Louis, Mo.
Hibbard, R. L., Jenkins Arcade, Pittsburgh, Pa.
Hickman, Charles D., Bellevue Court Bldg., Philadelphia, Pa.
Hier, Frederick P., 120 Broadway, New York, N. Y.
Hill, George F., 51 East 42nd St., New York, N. Y.
Hill, Herbert M., 301 Lexington Ave., New York, N. Y.
Hiller, Joseph L., 21 S. 12th St., Philadelphia, Pa.
Himelblau, Harry, Room 1260. 208 South La Salle St., Chicago, Ill.
Hoagland, I. G., 80 Maiden Lane, New York, N. Y.
Hoffman, J. D., Purdue University, Lafayette, Ind.
Hogg, James, 7 Academy St., Amsterdam, N. Y.
Holmes, Frederick S., 2 Rector St., New York, N. Y.
Holt, Herbert F., 425-426 Holston Natl. Bldg., Knoxville, Tenn.
Honiss, William H., care Hartford-Fairmont Co., Hartford, Conn.
Honolulu Iron Works Co., Woolworth Bldg., New York, N. Y.
Hope Engineering & Supply Co., Mt. Vernon, Ohio
Hoppe, John H., 508 Market St., San Francisco, Cal.
Houghton, Harry S., Atlas Bldg., 604 Mission St., San Francisco, Cal.
Hubbard, Harris & Rowell (Inc.), 1047 Broad St., Bridgeport, Conn.
Hugo, T. W., 221 W. 6th Ave., Duluth, Minn.
Hull, J. D., 854 Colman Bldg., Seattle, Wash.
Humphrey Gas Pump Co., 401 S. A. & K. Bldg., Syracuse N. Y.
Hunicke, O. Campbell, 27 William St., New York, N. Y.
Hunt, Andrew M., 206 Broadway, New York, N. Y.
Hunt, Leigh, 515 Reliance Bldg., Kansas City, Mo.
Hutchens, Edward, 708 Wisconsin St., Eau Claire, Wisconsin
Iltis, John, Ivy Ave., Englewood, N. J.
Industrial Engineering Corpn., Suite 920, Victoria Bldg., St. Louis, Mo.
Ingraham, Alexander, Calgary, Alberta, Can.
Irvin, Richard, 712-718 Fergerson Bldg., Pittsburgh, Pa.
Irwin, Oliver C., 50 Church St., New York, N. Y.
Jackson, Dugald C., Jackson & Moreland, 387 Washington St., Boston, Mass.
Jackson, Francis W., 86 West Oneida St., Oswego, N. Y.
Jackson, Leonard D., 56 Curtis Ave., Woodbury, N. J.
Jacoby, Henry E., 95 Liberty St., New York. N. Y.
Jellett, Stewart A. Co., 1200 Locust St., Philadelphia, Pa.
Jenks, Richard P., 1085 Grosvenor Bldg. Providence, R. I.
Johnson, F. Amos, Box 649, New Haven, Conn.
Johnson, George A. Co. (Inc.), 150 Nassau St., New York, N. Y.
Johnson, Henry S., R. F. D. 14, Babylon, L. I., N. Y.
Johnson, Louis L., Attica, Ind.
Johnson, Nathan C, 149 Broadway, New York, N. Y.
Johnson, Paul F., Altadena, Cal.
Jordan, Samuel S., Scarborough, Me.
Kaighn, Herbert E., 3143-45 Dupont Bldg., Wilmington, Delaware
Kaufman, Morris L., Kaufman & Levine, 36th St. & 7th Ave., New York, N. Y.
Kelly, Royal R., care Macoy, 45 John St., New York, N. Y.
Keilholtz, P. O., Continental Bldg., Baltimore, Md.
Kelly, Thomas C., 605 2nd Natl. Bank Bldg., Cincinnati, Ohio
Kemble, Thomas S., 5108 Euclid Ave., Cleveland, Ohio
Kennedy, Julian, Bessemer Bldg., Pittsburgh, Pa.
Kennedy, J. J., 52 Broadway, New York, N. Y.
Kennedy, Walter, Bessemer Bldg., Pittsburgh, Pa.
Kent, Robert Sayre (Inc), 50 Court St., Brooklyn, N. Y.
Key, James F., Box 244, Sierra Madre, Cal.
Kidd, Andrew, Jr., 95 Liberty St., New York, N. Y.
Kimball, Richard D. Co., 6 Beacon St., Boston, Mass.
Kinney, J. N., 30 Church St., New York, N. Y.
Kirsch, George H., Larkspur, Marin Co., Cal.
Kitson, Frank C., Hobart Bldg., San Francisco, Cal.
Klauder, Louis T., 901 Pennsylvania Bldg., Philadelphia, Pa.
Klepinger, John H., Brookston, Ind.
Knox, S. L. Griswold, 1 Exchange Bldg., Duluth, Minn.
Koenig, Adolph G., 405 Lexington Ave., New York N. Y.
Kramer, Xavier A., Magnolia, Miss.
Krehbiel Co., 1712 Marquette Bldg., Chicago, Ill.
Krueger, Geo. H., L. C. Smith Bldg., Seattle, Wash.
Krummel, Louis C., 488 Nostrand Ave., Brooklyn, N. Y.
Kurtz, Walter H., 4043 Greer Ave., St. Louis, Mo.
Kuss, Robert H., 990 Old Colony Bldg., Chicago, Ill.
Ladd, Jas B., 1011 Chestnut St., Philadelphia, Pa.
Lane, H. M. Co., 701 Owen Bldg., Detroit, Mich.
Lane, Horace H., 2320 Dime Bank Bldg., Detroit, Mich
Lang, J. Gustaf V., 8 W. 40th St., New York, N. Y.
Lang, Wm. H., 538 So. Dearborn St., Chicago, Ill.
Lapham, Jared S., Northville, Mich.
Larkin & Pratt, Arcade Bldg., St. Louis, Ill.
Lauder, George B., Concord, N. H.
Lauer, Herbert H., 128 S. 16th St., Allentown, Pa.
Ledermann, Frank, 21 Park Row, New York, N. Y.
Lee, Casenove G., Jr., 3401 Newark St., Washington, D. C.
Lee, Clifton, Jr., 918½ E. Main St., Richmond, Va.

Digitized by Google

Lee, William F., 713 E. Franklin St., Richmond, Va.
Lee, W. S., 511 5th Ave., New York, N. Y.
Leinert, Wenzel, 410 W. 23rd St., New York, N. Y.
Lenston, Charles S., 36 Wellington St., Worcester, Mass.
Leonard, David E., 608 East 105th St., Cleveland, Ohio
Leoni, A. M., 3832 Reistertown Rd., Baltimore, Md.
Lewis, D. J. Jr., Woolworth Bldg., New York, N. Y.
Lewis, Frederick H., Sunny Fields, Charlottesville, Va.
Lewis, Joseph E., 1218 Warner St., Baltimore, Md.
Lewis, Thornton, 1302 Land Title Bldg., Philadelphia, Pa.
Lewis, Warren B. 740 Grosvenor Bldg., Providence, R. I.
Lewis & Watts, 501 Lewis Bldg., Portland, Oregon
Libby, Malcolm, 39 William St., Worcester, Mass.
Lide, Martin J., 905-6 Woodward Bldg., Birmingham, Ala.
Lincoln, Joseph B., care Engineering Experiment Sta., Annapolis, Md.
Little, E. R. Co., (Inc.), 1918-1920 Ford Bldg., Detroit, Mich.
Livingston, Robert R., 2 Rector St., New York, N. Y.
Loomis, Evarts G., 207 Market St., Newark, N. J.
Lorenz, Wm. A., 60 Prospect St., Hartford, Conn.
Loss, Henrik V., Witherspoon Bldg., Philadelphia, Pa.
Lovell, Alfred, 619 Harrison Bldg., Philadelphia, Pa.
Lucke, Charles Edward, 117th St. & Broadway, New York, N. Y.
Luckenbach, J. Lewis, 113 10th Ave., Haddon Heights, N. J.
Luehrs, Daniel M., Ellaston Bldg., Cleveland, Ohio
Luhr, Otto, 154 W. Randolph St., Chicago, Ill.
Lyons, James W., 1420 Carroll Ave., Chicago, Ill.
McAuliffe, Pierce J., 17 Battery Place, New York, N. Y.
McCall, Snyder & McLean, 2348 Penobscot Bldg., Detroit, Mich.
McClintock, C. H., 700 Tramway Bldg., Denver, Colo.
McDonald-Churchill Corpn., 103 Park Ave., New York, N. Y.
McHollan, James A., 116 E. 19th St., New York, N. Y.
McIntire, Charles V., 66 Broadway, New York, N. Y.
McKee, Arthur G. & Co., 1303 Rockefeller Bldg., Cleveland, Ohio
McLaren, A. R., 693 Mission St., San Francisco, Cal.
McMillan, William L., 3212 Benner St., Wissinoming, Philadelphia, Pa.
McMullin, F. V., Mt. Gretna, Pa.
Main, Charles T., 201 Devenshire St., Boston, Mass.
Mandel, Arthur C., 56 East 87th St., New York, N. Y.
Manitus Engineering Co. (Inc.), 15 East 40th St., New York, N. Y.
Marburg Brothers (Inc.), 90 West St., New York, N. Y.
Marks, Lionel S., Harvard University, Cambridge, Mass.
Marsh, Arthur B., care Wright, Brown, Quinby & May, 53 State St., Boston, Mass.
Marshall, Norman, Waltham, Mass.
Marvin, Howard, 22 Mall St., Lynn, Mass.
Massey, Geo. B. Co., Peoples Gas Bldg., Chicago, Ill.
Matlock, Chaucey, Room 816, 949 Broadway, New York, N. Y.
Matlack, Ellwood V., 1723 Chicago Ave., Evanston, Ill.
Matter, G. O., 426 Board of Trade Bldg., Portland, Ore.
Mattsson, A. George, Great Lakes Eng. Works, River Rouge, Mich.
Maxfield, Lewis S., 537 West Broadway, Islip, N. Y.
Mayo, Edward H., 412 Traction Terminal Bldg., Indianapolis, Ind.
Meaker, Guy L., 311 Campbell St., Joliet, Ill.
Meron, Frederic, 27 Cedar St., New York, N. Y.
Merrill, J. J., 208 E. Illinois St., Chicago, Ill.
Merritt, Lucius R., 52 Vanderbilt Ave., New York, N. Y.
Meyer, Strong & Jones (Inc.), 101 Park Ave., New York, N. Y.
Michel, A. Eugene & Staff, 116 Nassau St., New York, N. Y.
Mickle, Robert T., 430 W. Stafford St., Germantown, Philadelphia, Pa.
Miller, Frank L., Davis-Miller Engrg. Co., Parkersburgh, W. Va.
Miller, Herman G., 1021 W. Boone Ave., Spokane, Wash.
Mills, Chas., 23 High St., Newton Upper Falls, Mass.
Misostow, Henry, 536 Rush St., Chicago, Ill.
Mole, Harvey E., 55 Liberty St., New York, N. Y.
Moody, V. D., 90 West St., New York, N. Y.
Moody, William F., 6 Boston Bldg., Denver, Colo.
Moore, Stanley H., Santa Barbara, Cal.
Morgan, John D., 2 Rector St., New York, N. Y.
Morrin & Coddington, Phelan Bldg., San Francisco, Cal.
Morrin, Thos., Phelan Bldg., San Francisco, Cal.
Morris, Albert Wood, 54 Buckingham St., Springfield, Mass.
Mosher, Chas. D., 64 Reade St., New York, N. Y.
Mount, Wm. D., 601 Peoples Natl. Bank Bldg., Lynchburg, Va.
Moyer, James A., State House, Boston, Mass.
Muckle, M. R., Jr., 220 S. Broad St., Philadelphia, Pa.
Mudge, Sterling W., Pratt Institute, Brooklyn, N. Y.
Murray, J. Vincent, 56 W. Randolph St., Chicago, Ill.
Murray, Warren E., 826 Merchants Exchange Bldg., San Francisco, Cal.
Murrie & Co. (Inc.), 74 Broadway, New York, N. Y
Myers, David Moffat, Griggs & Myers, 347 Fifth Ave., New York, N. Y.
Nate, Emile H., 2320 Greenwood St., Pueblo, Colo.
Neale, William McC., P. O. Box 351, Greensboro, North Carolina
Neiler, Samuel G., Manhattan Bldg., Chicago, Ill.
Newcomb, Edward C., North Scituate, Mass.
Newcomb, Robt. S., Palisade, N. J.
Newell, F. H., Urbana, Ill.
Newell, Wallace L., 1017 Alaska Building, Seattle, Wash.
Newhall, Ezra A., 1624 Pine St., Philadelphia, Pa.
Nikonow, J. P., 136 Liberty St., New York, N. Y.
Norden, Carl L., 375 Fulton St, Brooklyn, N. Y.

Digitized by Google

MECHANICAL (Continued)

Norelius, E. F., 430-31 Ardrus Bldg., Minneapolis, Minn.
Norris, Alexander Murdoch, 304 Continental Bldg., Baltimore, Md.
Nusbaum, Lee, 1119-21 H. Howard St., Philadelphia, Pa.
Offut, M. Webb, Georgetown, Ky.
O'Neill, J. G., 1542 Monadnock Block, Chicago, Ill.
Orrok, Geo. A., 124 E. 15th St., New York, N. Y
Osgood, John L., 45 Pearl St., Buffalo, N. Y.
Oswald, Harry A., Hamilton Motors Co. Grand Haven, Mich.
Ott, Albert J., 32 N. Clinton St., Chicago, Ill.
Parker, Francis W., 1410 Marquette Bldg., Chicago, Ill.
Parkhurst, Frederick A., Rm. 2611, Grand Central Terminal Bldg., New York, N. Y.
Parks, Byron E. Son, 625 Michigan Trust Bldg., Grand Rapids, Mich.
Parson, H. de B., 22 William St., New York, N. Y.
Paul, C. E., Armour Institute of Technology, 33rd & Federal Sts, Chicago, Ill.
Pausin, Hugo R., 49 Liberty St., Allendale, N. J.
Pearson, Robert H., Globe Indemnity Co., Washington Park, Newark, N. J.
Penney, Harold D., 9 Murray St., New York, N. Y.
Perkins, George H., 134 Batterymarch St., S. Boston, Mass.
Peterson, Frank P. & Co., 535 N. Cheyenne St., Tulsa, Okla.
Pfeffer, John E., 901 Webster Ave., Chicago, Ill.
Phelps, Frederick A., 920 Union Building, Newark, N. J.
Pillsbury, Charles L. Co., 1200 Second Ave. S., Minneapolis, Minn.
Pittelkow, Arthur G., 312 Larned St., Detroit, Mich.
Place, Clyde R., Grand Central Terminal, New York, N. Y.
Pollard, S. G., 1700 Wayne Ave., South Pasadena, Cal.
Pope Frederick, 366 Fifth Ave., New York, N. Y.
Posey, James, 925 Fidelity Bldg., Baltimore Md.
Powers, James, Hotel Commodore, New York, N. Y.
Prather, H. B., 664 Rockefeller Bldg., Cleveland, Ohio
Pratt, James A., Williamson School, P. O., Pa.
Price, Albert M., 825 Douglas Ave., Elgin, Ill.
Prindle, H. B., Grand Central Terminal, Rm. 5726, New York, N. Y.
Proutt, F. G., 374 Randolph Bldg., Memphis, Tenn.
Quick, Howard P., 35 Nassau St., New York, N. Y
Quick, Ray L., 5 Washington St., Armour Park, South Charleston, W. Va.
Rabbitt, James A. Engineering Corpn., 115 Broadway, New York, N. Y.
Radford, G. S., care Halstead Specialties Co., 503 Market St., San Francisco, Cal.
Rae, Frank B., 2214 Durant Ave., Berkeley, Cal.
Ramsdell, Thomas S., Housatonic, Mass.
Ramsey, George, 47th Floor, Woolworth Bldg. New York, N. Y.
Randolph, L. S., Govans, Baltimore, Md.
Ransom, T. W., 1104 Merchants Exch. Bldg., San Francisco, Cal.
Rasmusen, J. E., 1501 Yates St., Omaha, Neb.
Rautenstrauch, Walter, 43 Exchange Pl., New York, N. Y.
Ray, Frederick, 15 Broad St., New York, N. Y.
Raymond, Harold, 509 Chartres St., New Orleans, La.
Redfield, Edmund R., 301 2nd Ave., Sterling, Ill.
Reed, Van A., Jr., 1116 House Bldg., Pittsburgh, Pa.
Reeds & Thorpe, 60 Prospect St., Hartford, Conn.
Reeder, Charles L., Park Ave. & Saratoga St., Baltimore, Md.
Reeve, Sidney A., 280 Broadway, New York, N. Y.
Reimer, Arthur A., 45 S. Maple Ave., East Orange, N. J.
Reno, Jesse W., 261 Broadway, New York, N. Y.
Republic Engineers (Inc.), 60 Broadway, New York, N. Y.
Rice, Calvin W., 29 W. 39th St., New York, N. Y.
Rich, Edward P., Manhattan Bldg., Chicago, Ill.
Richardson, Chas. E., care Yale Club, New York, N. Y.
Richardson & Gay., 220 Devonshire St., Boston, Mass.
Rider, Joseph B., 26 Cortlandt St., New York, N. Y.
Riley, Champlain L., 101 Park Ave., New York, N. Y.
Riley, Lewis A. 2nd, Room 607, 103 Park Ave., New York, N. Y.
Roberts Company, 400 Washington Ave., Philadelphia, Pa
Roberts, Odin, 209 Washington St., Boston, Mass.
Robinson, A. W., 14 Phillips Sq., Montreal, Que., Canada
Robinson, Arthur D., Shanghai, China
Robinson, Dwight P. & Co. (Inc.), 125 East 46th St., New York, N. Y.
Roe, Walter H., Spayth Block, Tiffin, Ohio
Roekler, C. J., State Bank Bldg., Richmond, Va.
Rogers, A. A. Fidelity Bldg., Baltimore, Md.
Rogers, Chas. M., 710 Hibernia Bldg., New Orleans, La.
Rogers, Clarence M., 41 Fairview Ave., Daytona, Fla.
Aollins, W. B. & Co., 209 Railway Exchange Bldg., Kansas City, Mo.
Roney, William R., Kanawha National Bank Bldg., Charleston, W. Va.
Rose, F. W., Rose & Harris, Engrs., 318 Auditorium Bldg., Minneapolis, Minn.
Rosenzweig, Siegfried. 1816 Woolworth Bldg., New York, N. Y.
Ross, Charles E., 52 Beaver St., New York, N. Y.
Rothwell, C. R., 192 Broadway, New York, N. Y.
Runyon, Frederick O., 845 Broad St., Newark, N. J.
Russell, James G., 54 Stanley St., Dorchester, Mass.
Saalfrank, John M., 207 W. Tabor Rd., Philadelphia, Pa.
Salisbury, Royal D. Co., 1600 Downing St., Denver, Colo.
Sanderson & Porter, 52 William St., New York, N. Y.
Sando, Will J., 1013-16 Wells Bldg., Milwaukee, Wis.
Sargent, John W., 303 Benefit St., Providence, R. I.
Satherberg, Carl H., 1752 N. 26th St., Philadelphia, Pa.
Schirmer, Carl E., 1021 South Sandusky Ave., Bucyrus, Ohio
Schloss, Newton L., 531 W. 143rd St., New York, N. Y.
Schoenborn, William E., McGill Bldg., Washington, D.C.

Digitized by Google

Schoenijahn, Robert P., Industrial Trust Bldg., Wilmington, Del.
Schuetz, Fred'k F., 50 Church St., New York, N. Y.
Schuttler, Carl H., 731 Spitzer Bldg., Toledo Ohio
Schwab, Gustav, 4119 Yguavio Ave., Oakland, Cal.
Scott, James B., 503 S. 46th St., Philadelphia, Pa.
Scott, Walter Glenn, 52 Vanderbilt Ave., New York, N. Y.
Scrivenor, Arthur, Mutual Bldg., Richmond, Va.
Seavey, Chas. L., 1921 Holland Ave., Utica, N. Y.
Shadgen, Joseph F., P. O. Box 622, Pittsburgh, Pa.
Shaw, Louis E., 179 N. Parkway, East Orange, N. J.
Sherman, W. D., 222 N. Wilton Place, Los Angeles, Cal.
Shiebler, Marvin, 80 Broadway, New York, N. Y.
Shodron, John G., 411 East Milwaukee Ave., Fort Atkinson Wis.
Simmons, Herman R., P. O. Box 446, Peace Dale, R. I.
Sintz, Claude, 614 First St., Detroit, Mich.
Sitney, Massey, 1880 East 14th St., Brooklyn, N. Y.
Slaughter, Benjamin G., 1209-10 Stephen Girard Bldg., Philadelphia, Pa.
Smith, Edward J., 30 Church St., New York, N. Y.
Snow, Sylvester M., 55 Kilby St., Boston, Mass.
Snow, Welton A., Sandquist & Snow, Inc., Rm. 215, Columbia Bldg., Miami, Florida
Soben, Adolph F., 238-9-10 San Fernando Bldg., Los Angeles, Cal.
Somers, R. L., 1203 Union Trust Bldg., Providence, R. I.
Spackman, Henry S., 2024 Arch St., Philadelphia, Pa.
Stahl, Rodolphe, 655 Book Bldg., Detroit Mich.
Steele, Hugh E., 109 Broad St., New York, N. Y.
Stevens, John A., 8 Merrimack St., Lowell, Mass.
Stevens, R. C., 560 Lincoln Ave., Erie, Pa
Stitzer, A. B., 60 Broadway, New York, N. Y.
Street, Clement F., Box 353 Greenwich, Conn.
Strouse, Sidney B., 429 Guarantee Trust Bldg., Atlantic City, N. J.
Stucki, Arnold, Oliver Bldg., Pittsburgh, Pa.
Stumph Una-Flow Engine Co. (Inc.), 401 S. A. & K. Bldg., Syracuse, N. Y.
Suck, Adolph, Hyde Park Station, Boston, Mass.
Sullivan, William L., P. O. Box 1224, Tulsa, Okla.
Sutton, Frank, 140 Cedar St., New York, N. Y.
Sutton, Frank W., 4500 Euclid Ave., Cleveland, Ohio
Swan, John Joseph, 80 Church St., New York, N. Y.
Sweeney, John M., 729 Monadnock Block, Chicago, Ill.
Sweet, Ernest E., Detroit, Mich.
Switzer, John A., University of Tenn., Knoxville, Tenn.
Symons, Wilson E., c-o. Elks Club, W. 43d St., New York, N. Y.
Syracuse Industrial Gas Co., 206 McCarthy Bldg., Syracuse, N. Y.
Szepesi Industrial Organization, 678 Boylston St., Boston, Mass.
Taggart, James M., 1170 Broadway, New York, N. Y.
Tappen, Charles O., 2 Rector St., New York, N. Y.
Taylor, Alfred James Towle, Van Couver, B. C., Can.
Taylor & Downes, 301 Gaston Bldg., Dallas, Tex.
Tenney, Charles H. & Co., 201 Devonshire St., Boston, Mass.
Thomas, David G., Hotel Metropole, Denver, Colo.
Thomson, J. Stewart, 95 Liberty St., New York, N. Y.
Thomas, David G., Hotel Metropole, Denver, Colo.
Thomas, Percy H., 120 Broadway, New York, N. Y.
Thomson, Samuel G., 125 Riverside Drive, New York, N. Y.
Thompson, Hugh L., Waterbury, Conn.
Thomson, Samuel G., 125 Riverside Drive, New York, N. Y.
Thomson, Thomas S., 340 So. Gramercy Pl., Los Angeles, Cal.
Thompson & Lichtner Co., 186 Federal St., Boston, Mass.
Thornton, W. F., 5718 Apletree St., Philadelphia, Pa.
Timis, Pierce, 15 East 40th St., New York, N. Y.
Tobey, William L., 74 Washington Ave., Winthrop, Mass.
Toltz, King & Day (Inc.), 1410 Pioneer Building, St. Paul, Minn.
Tomlines, Thomas L., 317 City Bank Bldg., Syracuse, N. Y.
Tomlinson, Malcolm C. W., 302 Bushnell Bldg., Springfield, Ohio
Tomlinson, Royal D., 2322 Main St., Buffalo, N. Y.
Tuska, Gustave R., 68 William St., New York, N. Y.
Ulmann, Carl J., 113 Grand St., New York, N. Y.
Unger, John S., 4700 Beacon St., Chicago, Ill.
U. S. Products Corpn., 1428 McCormich Bldg., Chicago, Ill.
Valentine, F. H., 621 Bangor Bldg., Cleveland, Ohio
Vanderhoof, Arnold H., 49 Patton Ave., Asheville, North Caroline
Van Law, Carlos W., 120 Broadway, 3123 Equitable Bldg., New York, N. Y.
Van Winkle, Edw., 37 Wall St., New York, N. Y.
Varney, William W., 1229 Calvert Building, Baltimore, Md.
Vaughn, Aubrey W., West Brookfield, Mass.
Vaughan, John F., 185 Devonshire St., Boston, Mass.
Vehslage, H. E., 81 Fulton St., N., New York, N. Y.
Verner, W. F., 520 Book Bldg., Detroit, Mich.
Vickess, Samuel, 129 Front St., New York, N. Y.
Vincent, S. Arthur, 225 W. 86th St., c-o. The Belnord Apts., New York, N. Y.
Waddell, Charles E., 78 Patton Ave., Asheville, N. C.
Wadsworth, Frank L. O., Box 1, East Liberty Sta., Pittsburgh, Pa.
Wagner, Hugh K., 11 N. 7th St., St. Louis, Mo.
Wainright, Arthur V., 49 Wall St., New York, N. Y.
Waite, Edward B., Drawer 946, Westboro, Mass.
Waite, Lorenzo E., 430 Elder Drive, Toledo, Ohio
Waitt, Arthur M., Sharon, Conn.
Walker, Gilbert S., 916 Park Bldg., Pittsburgh, Pa.
Walser, Arthur, 58 Warren St., New York, N. Y.
Walther, Arthur O., Pikeville, Ky.

Digitized by Google

MECHANICAL (Continued)
Warren, Ralph H., 228 South Mountain Ave., Montclair, N. J.
Watkins, Arthur M., 165 Broadway, New York, N. Y.
Watts, C. A., 24 California St., San Francisco, Cal.
Weaver & Kemble, 5108 Euclid Ave., Cleveland, Ohio
Webster, Wm. R., 411 Walnut St., Philadelphia, Pa.
Wells, Frederick L., 101 S. Clinton St., Chicago, Illinois
Wells, Geo. E., Boatmen's Bank Bldg., St. Louis, Mo.
Westcott & Mapes (Inc.), 207 Orange St., New Haven, Conn.
Weston, Burt R., 402 Commercial Bldg., Dayton, Ohio
Whinery, Samuel B., 95 Liberty St, New York, N. Y.
White, E. Milton, 324 Wilcox Bldg., Los Angeles, Cal.
Whitham, Jay M., 607 Bullitt Bldg., Philadelphia, Pa.
Whiting, Charles W., 148 State St., Boston, Mass.
Whittlesey, James T., Claus Spreckels Bldg., San Francisco, Cal.
Wieland, C. F., 1803 Claus Spreckels Bldg., San Francisco, Cal.
Wilbur, Ralston T., Olympic Club, San Francisco, Cal.
Wilderman, Rudolf, 160 Fifth Ave., New York, N. Y.
Wilhelm, J. H. (Inc.), 42 W. 39th St., New York, N. Y.
Wilke, William, 86 Norwood Ave., Buffalo, N. Y.
Wilkinson, Thomas L., 406-407 Boston Bldg., Denver, Colo.
Williams, N. N., 3216 Prospect St., Kansas City, Mo.
Wilson, James E., 205 W. 122nd St., New York, N. Y.
Wilson, Lester G., 2400 16th St., Washington, D. C.
Winestock, Otto C., Perkinsville, Vt.
Witker, Charles J., 848 Virginia St., Toledo, Ohio
Wolcott, Henry A., New Britain Ave., West Hartford, Conn.
Wolff, Richard A., 405 Lexington Ave., New York, N. Y.
Wood, Albert C., 1208 Stock Exchange Bldg., Wynnefield, Philadelphia, Pa.
Wood, Arthur J., 410 Allen St., State College, Pa.
Wood, Wm. H., 10 South Ave., Media, Pa.
Woodwell, J. E., 501 Fifth Ave., New York, N. Y.
Wright, Percy E., 2012 L. C. Smith Bldg., Seattle, Wash.
Wunsch & Washburn, 802-804 McDougal St., Brooklyn, N. Y.
Wyer, Samuel S., 1014 Hartman Bldg., Columbus, Ohio
York, H. W., 120 Broadway, New York, N. Y.
Zamboni, Lawrence, 50 Church St., New York, N. Y.
Zimmerman, Fred R., 1313 Early Ave., Edgewater Sta., Chicago, Ill.

METALLOGRAPHY (Non-ferrous)
Bierbaum, Christopher H., 1011 Mutual Life Building, Buffalo, N. Y.

METALLURGICAL
Addicks, Lawrence, 51 Maiden Lane, New York, N. Y.
Freyn, Brassert & Co., 122 S. Michigan Ave., Chicago, Ill.
Hastings, Glen B., First Natl. Bank Bldg., Williamsport, Pa.
Hibbard, Henry D., 144 E. 7th St., Plainfield, N. J.
Hollis, H. L., 1025 Peoples Gas Bldg., Chicago, Ill.
Kaufman, Emanuel, 2 Rector St., New York, N. Y.
Kinkead, J. A., Rialto Bldg., San Francisco, Cal.
McGregor, A. Grant, Warren, Ariz.
Moldenke, Dr. Richard, Watchung, N. J.
Robinson, Louis G., 31 E. 4th St., Cincinnati, Ohio
Waldo, Leonard, 14 Wall St., New York N. Y.

—Iron and Steel
Colby, Albert Ladd, Brighton St., Bethlehem, Pa.

MILL ARCHITECTS
Baxter, Burke M., 5716 Euclid Ave., Cleveland, Ohio
Phelps, Frederick A., 920 Union Bldg., Newark, N. J.

—Paper
Carey, James L., 208 N. Laramie Ave., Chicago, Ill.

MILLS
(See also Brass, Paper, Pipe, Pulp, Rolling, Steel, Textile, Wire)
Brown, Edward C. & Co., 220 Devonshire St., Boston, Mass.
Chase, Nathaniel S., 49 Borden Block, Fall River, Mass.
De Wolf, John O., 45 Bromfield St., Boston, Mass.
Leary, Frank J., Times Bldg., New Bedford, Mass.
Main, Chas. T., 201 Devonshire St., Boston, Mass.
Makepeace, Chas. R., Box 1146, Providence, R. I.
Richmond, Knight C., 10 Weybosset St., Providence, R. I.
Simmons, Herman R., P. O. Box 446, Peace Dale, Rhode Island
Sutton, Frank, 140 Cedar St., New York, N. Y.
Walker, Frank A., Leary and Walker, New Bedford, Mass.

MINING
(See also Geological)
Brown, Herman E., 342 Madison Ave., New York, N. Y.
Brunton, D. W., 730 Symes Bldg., Denver, Colo.
Conklin, H. R., Joplin, Mo.
Orecelius & Phillips, 1302 Hanna Bldg., Cleveland, Ohio
Foster, Rufus J., 826 Manhattan Ave., Brooklyn, N. Y.
Hammond, John Hays, Lookout Hill, Gloucester, Mass.
Henning, John L., Lake Charles, La.
Hollis, H. L., 1025 Peoples Gas Bldg., Chicago, Ill.
Lauer, Herbert H., 123 So. 16th St., Allentown, Pa.
Moore, Carl F., 55 Congress St., Boston, Mass.
Norris, R. V., 524 2nd Natl. Bank, Wilkes-Barre, Pa.
Robbins, Percy A., Rm. 1001, Hobart Bldg., San Francisco, Cal.
Roney, William B., Kanawha National Bank Bldg., Charleston, W. Va.
Ware, Arthur L., Hazard, Ky.

—Sulphur
Henning, John L., Lake Charles, La.

—Surface
Massey, Geo. B. Co., Peoples Gas Bldg., Chicago, Ill.

Digitized by Google

MINING PLANTS
Behr, H. C., 2 Rector St., New York, N. Y.

MOTION STUDY
Gilbreth, Frank B. (Inc.), 68 Eagle Rock Way, Montclair, N. J.
Scott, Walter Glenn, 52 Vanderbilt Ave., New York, N. Y.

MOTOR TRUCKS
Kemble, Thomas S., 5108 Euclid Ave., Cleveland, Ohio
Kennedy, William P., 1767 Broadway at 57th St., New York, N. Y.
Myers, Cornelius T., Rahway Natl. Bank Bldg., Rahway, N. J.
U. S. Products Corpn., 1428 McCormich Bldg., Chicago, Ill.
Weaver & Kemble, 5108 Euclid Ave., Cleveland, Ohio
Whitte, Captain, 219 W. 81st St., New York, N. Y.

MUNICIPAL
Allen, Henry A., Room No. 23, No. 154 West Randolph St., Chicago, Ill.
Larkin & Pratt, Arcade Bldg., St. Louis, Mo.
Tolts, King and Day (Inc.), 1410 Pioneer Building, St. Paul, Minn.

N

NATURAL GAS
Barrett, William E., 56 Pine St., New York, N. Y.
Chadwick & Bendit, 517 Finance Bldg., Kansas City, Mo.
Hope Engineering & Supply Co., Mt. Vernon, Ohio
Wyer, Samuel S., 1014 Hartman Bldg., Columbus, Ohio

NATURAL GAS PLANTS
Peterson, Frank P. & Co., 535 N. Cheyenne St., Tulsa, Okla.

NAVAL
(See also Marine)
Bratt & Petersen, Hackensack, N. J.
Hardesty, Frederick S., Commercial Natl. Bank Bldg., Washington, D. C.
Norden, Carl L., 375 Fulton St., Brooklyn, N. Y.

NAVAL ARCHITECTS
Fryer, Ross L., 817-818 Albee Bldg., Washington, D. C.

O

OFFICE BUILDINGS
Place, Clyde R., Grand Central Terminal, New York, N. Y.

OIL
(See also Gas and Oil, Petroleum)
Ehrmann, Carl, 288 Bowery, New York, N. Y.

OIL BURNERS
Merritt, James S., 1010 Harrison Bldg., Philadelphia, Pa.
U. S. Products Corpn., 1428 McCormich Bldg., Chicago, Ill.

OIL FUEL
Cary, Albert A., 95 Liberty St., New York, N. Y.
Merritt, James S., 1010 Harrison Bldg., Philadelphia, Pa.
Rothwell, C. R., 192 Broadway, New York, N. Y.
String, J. S. & J. F., 19 Whitney Ave., New Haven, Conn.

OIL PRESSING EQUIPMENT
Carver, Fred S., 8 West 40th St., New York, N. Y.

OIL PROPERTY DEVELOPMENT
Barrett, William E., 56 Pine St., New York, N. Y.
Rogers, A. A., Fidelity Bldg., Baltimore, Md.

OIL REFINERIES
Beatie, Cecil E., 90 West St., New York, N. Y.
Bertsch, John C., 10 Lucerne Apts., Cor. 10th & So. Boxton Sts., Tulsa, Okla.
Fink, J. B., 527 Robinson Bldg., Tulsa, Okla.
Foster, Dean E., 812 So. Cincinnati Ave., Tulsa, Okla.
Larkin & Pratt, Arcade Bldg., St. Louis, Mo.
Peterson, Frank P. & Co., 535 N. Cheyenne St., Tulsa, Okla.
Murrie & Co. (Inc.), 74 Broadway, New York, N. Y.

OIL STORAGE & DISTRIBUTING SYSTEMS
Somers, R. L., 1208 Union Trust Bldg., Providence, R. I.

ORE DRESSING
Hiller, Joseph L., 21 S. 12th St., Philadelphia, Pa.

ORGANIZATION
(See also Factories, Public Utilities, Reorganization)
Arison, Goodwin and Associates, 327 So. La Salle St., Chicago, Ill.
Bayne, C. William, 15 E. Hartford St., Muskegon, Mich.
Baker, Wm. H., 120 Broadway, New York, N. Y.
Bedaux, Chas. E. Co., 4500 Euclid Ave., Cleveland, Ohio
Calder, John, 19 Goodwin Rd., Lexington, Mass.
Cooley-Marvin Co., 15 Ashburton Place, Boston, Mass.
Churchill, W. L., 103 Park Ave., New York, N. Y.
Curtis, Walter M., 141 Firglade Ave., Springfield, Mass.
Emerson, Harrington, 30 Church St., New York, N. Y.
Gerard, Graham & Co., 202 S. State St., Chicago, Ill.
Gilbreth, Frank G. (Inc.), 68 Eagle Rock Way, Montclair, N. J.
Hanks, Henry M., 441 Franklin Ave., Brooklyn, N. Y.
Hannah, Frederick A., 32 W. 40th St., New York, N. Y.
Ingham, Howard M., 140 Nassau St., New York, N. Y.
Kaighn, Herbert E., 3143-45 Dupont Bldg., Wilmington, Del.
—Textile
Cox, James W., Jr., 320 Broadway, New York, N. Y.

ORDNANCE
Birnie & Hawkins, 511 Fifth Ave., New York, N. Y.
Eickhoff, Theodore H., 5716 Euclid Ave., Cleveland, Ohio
Jakobsson, Herman, 228 Spruce Ave., Takoma Park, D. C.
Kaighn, Herbert E., 3143-45 Dupont Bldg., Wilmington, Del.
Kidder, Walter M., 126 West 56th St., New York, N. Y.
Leonard, David E., 608 E. 105th St., Cleveland, Ohio
McDonald-Churchill Corpn., 103 Park Ave., New York, N. Y.
Mahoney, J. N., 615 77th St., Brooklyn, N. Y
Oswald, H. A., Hamilton Motors Co., Grand Haven, Mich.
Randolph, L. S., Govans, Baltimore, Md.
Rautenstrauch, Walter, 43 Exchange Place, New York, N. Y.
Rogers, A. A, Fidelity Bldg., Baltimore, Md.
Scott, Walter Glenn, 52 Vanderbilt Ave., New York, N. Y.

Digitized by Google

P

PACKING MACHINERY
Hill, Herbert M., 301 Lexington Ave., New York, N. Y.

PAPER MILLS
Albertson, Don John, Kalamzoo, Mich.
Baxter, Burke M., 5716 Euclid Ave., Cleveland, Ohio
Carey, James L., 208 N. Laramie Ave., Chicago, Ill.
Ferguson, Hardy S., 200 Fifth Ave., New York, N. Y.
Hardy, George F., 309 Broadway, New York, N. Y.
Little, Arthur D. (Inc.), 30 Charles River Rd., Cambridge, Mass.
Preble, Stephen E., Industrial Planning Corpn., 80 W. Genesee St., Buffalo, N. Y.
Wallace, Joseph H. & Co., 5 Beekman St., New York, N. Y.

—Ventilation
Briner, E. A., 559 Central Ave., E. Orange, N. J.

PAPER WORKING MACHINERY
Hill, M. Herbert, 301 Lexington Ave., New York, N. Y.

PATENT EXPERTS
Bierbaum, Christopher H., 1011 Mutual Life Building, Buffalo, N. Y.
Carey, Albert A., 95 Liberty St., New York, N. Y.
Fassett, Francis K., 1302-1308 U. B. Bldg., Dayton, Ohio
Hahn, Conrad V., P. O. Box 4089, Philadelphia, Pa.
Hammer, Edwin W., 160 Broadway, New York, N. Y.
Harris, Ford W., 933 Higgins Bldg., Los Angeles, Calif.
Lockwood, Marquis H., 2 Rector St., New York, N. Y.
McCalister, Edgar W., Oliver Bldg., Pittsburgh, Pa.
Newcomb, Benjamin R., Victor Bldg., Washington, D. C.
Penney, H. D., 9 Murray St., New York, N. Y.
Reeve, Sidney A., 280 Broadway, New York, N. Y.
Scrivenor, Arthur, Mutual Bldg., Richmond, Va.
Sessions, Frank L., 422 Kirby Bldg., Cleveland, Ohio
Webster, Arthur Gordon, 85 William St., Worcester, Mass.

PATENT LAWYERS
Alexander & Dowell, Washington Loan & Trust Bldg., Washington, D. C.
Ammen, F. Du Pont, 613-16 Bank of Commerce Bldg., St. Louis, Mo.
Ashley, Frank M., 154 Nassau St., New York, N. Y.
Barkelew, James T., 911 Central Bldg., Los Angeles, Cal.
Byrne, H. H., Wash. Loan & Trust Bldg., Washington, D. C.
Dowell, Arthur E., Washington Loan & Trust Bldg., Washington, D. C.
Eckert, Arthur C., Title Guaranty Bldg., St. Louis, Mo.
Greenwood, T. T., 40 Court St., Boston, Mass.
Hamilton, James, Ouray Bldg., 8th & G Sts., Norhtwest, Washington, D. C.
Harris, Ford W., 933 Higgins Bldg., Los Angeles, Cal.
Hunicke, C. Campbell, 27 William St., New York, N. Y.
McCallister, Edgar W., Oliver Bldg., Pittsburgh, Pa.
Marsh, Arthur B., c-o. Wright, Brown, Quinby & May, 53 State St., Boston, Mass.
Parker, Francis W., 4110 Marquette Bldg., Chicago, Ill.
Penney, Harold D., 9 Murray St., New York, N. Y.
Prindle, Edwin J., 111 Broadway, New York, N. Y.
Ramsey, George, 47th Floor, Woolworth Bldg., New York, N. Y.
Roberts, Odin, 209 Washington St., Boston, Mass.
Schoenborn, William E., McGill Bldg., Washington, D. C.
Schuetz, Fredk. F., 50 Church St., New York, N. Y.
Smith, A. Parker, 61 Broadway, New York, N. Y.
Smith, Dyer, c-o. Ward, Crosby & Smith, Woolworth Bldg., New York, N. Y.
Varney, William W., 1229 Calvert Building, Baltimore, Md.
Wagner, Hugh K., 114 N. 7th St., St. Louis, Mo.
Whitman, Ray B., University Club, Bridgeport, Conn.

PAVEMENTS
Cantell, M. T., 1302 Union Trust Bldg., Winnipeg, Canada
Salisbury, Royal D. Co., 1600 Downing St., Denver, Colo.

PETROLEUM
(See also Oil)
Beatie, Cecil E., 90 West St., New York, N. Y.
Chadwick & Bendit, 517 Finance Bldg., Kansas City, Mo.
Fink, J. B., 527 Robinson Bldg., Tulsa, Okla.
Gray, John L., 41 E. 42d St., New York, N. Y.
Henning, John L., Lake Charles, La.
Hollis, H. L., 1025 Peoples Gas Bldg., Chicago, Ill.
Hope Engineering & Supply Co., Mt. Vernon, Ohio
Peterson, Frank P. & Co., 535 N. Cheyenne St., Tulsa, Okla.
Williams, W. C., Oklahoma City, Okla.

PIPE LINES (Oil)
Beatie, Cecil E., 90 West St., New York, N. Y.

PIPE MILLS
Ellis, Frank I., Farmers Bank Bldg., Pittsburgh, Pa.
Steere Engineering Co., Woodward & Horton Aves., Detroit, Mich.

PIPING
(See also Power Plants)
Lewis, D. J., Jr., Woolworth Bldg., New York, N. Y.
Tulloss, Joseph C., 11 W. 39th St., New York, N. Y.

PLANTS
(See Cement, Coal Handling, Filtration, Flour, Milling, Foundry, Gasoline, Gypsum, Ice Making, Industrial, Mining, Natural Gas, Potash, Power, Pumping, Steam)

—Designing
Gunn, Carle & Co., 444 Market St., San Francisco, Cal.

PORT DEVELOPMENT
(See Harbor Improvement)

POTASH PLANTS
Cannon-Swenson Co., 53 W. Jackson Blvd., Chicago, Ill.
Kraemer, Milton, 515-517 Rialto Bldg., San Francisco, Cal.

POWER
Baker, C. T., 821 Candler Bldg., Atlanta, Ga.
Gay, Harry, Richardson & Gay, 220 Devonshire St., Boston, Mass.

Digitized by Google

Rothwell, C. R., 192 Broadway, New York, N. Y.
Thomas, Percy H., 120 Broadway, New York, N. Y.

—Development
Landreth, Olin Henry, 156 Fifth Ave., New York, N. Y.

—Distribution
Breslove, Joseph, Oliver Bldg., Pittsburgh, Pa.

—Generation
Anderson, A. C., 524-6 Bee Bldg., Omaha, Neb.
Bierbaum, Christopher H., 1011 Mutual Life Building, Buffalo, N. Y.
Brown, John Wilson, Jr., 1213 Filbert St., Philadelphia, Pa.
Christie, A. G., Johns Hopkins University, Baltimore, Md.
Cleghorn, M. P., 513 Ash Ave., Ames, Iowa
Dalley, A. H. Charles, 801-122 S. Michigan Ave., Chicago, Ill.
Duryee, Andrew B., 39 Liberty Ave., New Rochelle, N. Y.
Esselstyn, Murphy & Hanford, 810 Marquette Bldg., Detroit, Mich.
Garland, C. M., 1140 First National Bank Bldg., Chicago, Ill.
Gates, S. J., 69 Wisconsin St., Milwaukee, Wis.
Gebhardt, G. F., Armour Inst. of Tech., Chicago, Ill.
Hickman, Charles D., Bellevue Court Bldg., Philadelphia, Pa.
Jackson, Dugald C., Jackson & Moreland, 387 Washington St., Boston, Mass.
Koebig, A. W., 841 Title Insurance Bldg., Los Angeles, Cal.
Kraemer, Milton, 515-517 Rialto Bldg., San Francisco, Cal.
Mullergren Arthur L., Firestone Bldg., Kansas City, Mo.
Polakov, Walter N. & Co. (Inc.), 33 West 42nd St., New York, N. Y.
Richmond, Knight C., 10 Weybosset St., Providence, R. I.
Safford, Arthur T., 66 Broadway, Lowell, Mass.
Sargent, John W., 303 Benefit St., Providence, R. I.
Sullivan, William L., P. O. Box 1224, Tulsa, Okla.
Tomlinson, Malcolm C. W., 302 Bushnell Bldg., Springfield, Ohio
Westcott & Mapes (Inc.), 207 Orange St., New Haven, Conn.
White, E. Milton, 324 Wilcox Bldg., Los Angeles, Cal.
Wood, Albert C., 1203 Stock Exchange Bldg., Wynnefield, Philadelphia, Pa.
Woodwell, J. E., 501 Fifth Ave., New York, N. Y.

—Transmission
Jackson, Dugald C., Jackson & Moreland, 387 Washington St., Boston, Mass.
Mosher, W. H., 80 W. Genesee St., Buffalo, N. Y.
Mullergren, Arthur L., Firestone Bldg., Kansas City, Mo.
Randolph, L. S., Govans, Baltimore, Md.
Spengler, Warren D., 870 Hanna Bldg., Cleveland, Ohio
White, J. G. Engineering Corpn., 43 Exchange Place, New York, N. Y.

—Transmission (Electric)
Stevens, John A., 8 Merrimack St., Lowell, Mas.

POWER PLANTS

Azbe, Victor J., 2194 Railway Exchange Bldg., St. Louis, Mo.
Baker, C. T., 821 Candler Bldg., Atlanta, Ga.
Belcher, P. W., 219 Dooly Block, Salt Lake City, Utah
Biggs, W. E., Engineering Co., Knoxville, Tenn.
Bradt, Morris, 1121 Holston Bank Bldg., Knoxville, Tenn.
Bratt & Peterson, Hackensack, N. J.
Breslove, Jos., Oliver Bldg., Pittsburgh, Pa.
Brown, Edward C. & Co., 220 Devonshire St., Boston, Mass.
Chester, J. N., 1107-1114 Union Bank Bldg., Pittsburgh, Pa.
Cooley & Marvin Co., 16 Ashburton Place, Boston, Mass.
Day & Zimmermann (Inc.), 611 Chestnut St., Philadelphia, Pa.
Ehrlich, M. Wm., 96 Fifth Ave., New York, N. Y.
Freyn, Brassert & Co., 122 S. Michigan Ave., Chicago, Ill.
Fuller Engineering Co., Allentown, Pa.
Gilmore, T. N., 136 Liberty St., New York, N. Y.
Gren, Samuel M. Co., Springfield, Mass.
Greydanus, S. E., 112 Ellison St., Cor. Main, Paterson, N. J.
Haven, H. M. & Crosby, Wm. W., 40 Court St., Boston, Mass.
Hickman, Charles D., Bellevue Court Bldg., Philadelphia, Pa.
Hollis French & Allen Hubbard, 88 Pearl St., Boston, Mass.
Hopkins, M. S., 807 First National Bank Bldg., Columbus, Ohio
Hurd, Charles H., 1405 Merchants Bank Bldg., Indianapolis, Ind.
Jackson, Dugald C., Jackson & Moreland, 387 Washington St., Boston, Mass.
Jellett, Stewart A., Co., 1200 Locust St., Philadelphia, Pa.
Kent, Robert Sayre (Inc.), 50 Court St., Brooklyn, N. Y.
Klauder, Louis T., 901 Pennsylvania Bldg., Philadelphia, Pa.
Kraemer, Milton, 515-517 Rialto Bldg., San Francisco, Cal.
Lane, Horace H., 2320 Dime Bank Bldg., Detroit, Mich.
Lewis & Watts, 501 Lewis Bldg., Portland, Oregon
McClintock & Craig, 33 Lyman St., Springfield, Mass.
Moore, W. E. & Co., Union Bank Bldg., Pittsburgh, Pa.
Neale, William McC., P. O. Box 351, Greensboro, N. C.
Norton, Fred. E., 656 Main St., Worcester, Mass.
Orrok, Geo. A., 124 E. 15th St., New York, N. Y.
Place, Clyde R., Grand Central Terminal, New York, N. Y.
Posey, James, 925 Fidelity Bldg., Baltimore, Md.
Powell, William B., Industrial Planning Corpn., 80 W. Genesee St., Buffalo, N. Y.
Railway & Industrial Engineers (Inc.), 25 Broad St., New York, N. Y.
Reeds, Clarence, Reeds & Thorpe, 60 Prospect St., Hartford, Conn.
Richardson & Gay, 220 Devonshire St., Boston, Mass.
Rippey, S. Howard, 7012 Greene St., Germantown, Philadelphia, Pa.
Rucker, B. Parks, 103 Park Ave., New York, N. Y.
Salisbury, Royal D. Co., 1600 Downing St., Denver, Colo.
Schlank, Elias, 51 Pennsylvania Ave., Newark, N. J.
Spengler, Warren D., 870 Hanna Bldg., Cleveland, Ohio
Stevens, John A., 8 Merrimack St., Iowell, Mass.

Digitized by Google

POWER PLANTS (Continued)
Stirling, Allan, 321 Drexel Bldg., Philadelphia, Pa.
Swoboda (Inc.), H. O., Empire Bldg., Pittsburgh, Pa.
T-S-M-E-Engineering Corpn., Iroquois Bldg., Buffalo, N. Y.
Taggart, James M., 1170 Broadway, New York, N. Y.
Taylor & Downes, 801 Gaston Bldg., Dallas, Tex.
Toltz, King and Day (Inc.), 1410 Pioneer Building, St. Paul, Minn.
Tulloss, Joseph C., 11 W. 39th St., New York, N. Y.
Vaughan, John F., 185 Devonshire St., Boston, Mass.
Westcott & Mapes (Inc.), 207 Orange St., New Haven, Conn.
White, J. G. Engineering Corpn., 43 Exchange Place, New York, N. Y.
Whiting, Charles W., 148 State St., Boston, Mass.

—Cost Accounting
Collins, Hubert E., 132 Boyce Ave., Utica, N. Y.

—Designing
Acheson, A. R., 601 Eckel Theatre Bldg., Syracuse, N. Y.
Adler, Alphonse A., 9 Murray St., New York, N. Y.
Ballinger Co., S. E. Cor. 12th & Chestnut, Philadelphia, Pa.
Cary, Albert A., 95 Liberty St., New York, N. Y.
Chase, Nathaniel S., 49 Borden Block, Fall River, Mass.
Collins, Hubert E., 1312 Boyce Ave., Utica, N. Y.
Engineering & Commerce Corpn., 461 8th Ave., New York, N. Y.
Fuel Engrg. Co. of N. Y., 106 E. 19th St., New York, N. Y.
Hickman, Charles D., Bellevue Court Bldg., Philadelphia, Pa.
Hope Engineering & Supply Co., Mt. Vernon, Ohio
Kedy, Stiles F., 12 Pearl St., Boston, Mass.
McHollan, James A., 116 East 19th St., New York, N. Y.
MacLeod, Norman, MacCallum, 47 W. Louden St., Germantown, Philadelphia, Pa.
Mizostow, Henry, 536 Rush St., Chicago, Ill.
Myers, David Moffat, Griggs & Myers, 347 Fifth Ave., New York, N. Y.
Norton, Fred. E., 656 Main St., Worcester, Mass.
Scrivenor, Arthur, Mutual Bldg., Richmond, Va.

—Gas
Magruder, Wm. T., 1922 Summit St., Columbus, Ohio

—Hydroelectric
Finkle, Frederick Cecil, 448-449 I. W. Hellman Bldg., Los Angeles, Cal.
Harza, L. F., 115 S. Dearborn St., Chicago, Ill.
Holland, Ackerman & Holland, 106 E. Liberty St., Ann Arbor, Mich.
Hutchinson, Cary T., 17 West 46th St., New York, N. Y.
McClintock & Craig, 33 Lyman St., Springfield, Mass.
Main, Charles T., 201 Devonshire St., Boston, Mass.

—Labor Organization
Collins, Hubert E., 132 Boyce Ave., Utica, N. Y.

—Management
Kedy, Stiles F., 12 Pearl St., Boston, Mass.
McHolan, James A., 116 E. 19th St., New York, N. Y.
Polakov, Walter N. & Co. (Inc.), 33 West 42nd St., New York, N. Y.

—Oil Engine (Diesel)
Verhey, Hubert C., 1028 Real Estate Trust Bldg., Philadelphia, Pa.

—Operation
Collins, Hubert E., 132 Boyce Ave., Utica, N. Y.
Fuel Engrg. Co. of N. Y., 106 E. 19th St., New York, N. Y.
Norton, Fred. E., 656 Main St., Worcester, Mass.

—Steam Turbine
Breslove, Joseph, Oliver Bldg., Pittsburgh, Pa.

PRESSES, HYDRAULIC
Carver, Fred S., 8 West 40th St., New York, N. Y.

PRODUCTION
(See also Efficiency)
Arison, Goodwin and Associates, 327 So. La Salle St., Chicago, Ill.
Batavia Service Corpn., 29 Broadway, New York, N. Y.
Bayne, C. William, 15 E. Hartford St., Muskegon, Mich.
Bedaux, Chas. E. Co., 4500 Euclid Ave., Cleveland, Ohio
Churchill, W. L., 103 Park Ave., New York, N. Y.
Crowell, Henry W., Rm. 1026 Kinney Bldg., Newark, N. J.
Emerson, Harrington, 30 Church St., New York, N. Y.
Gerard, Graham & Co., 202 S. State St., Chicago, Ill.
Gerber, S. R., 309 Broadway, New York, N. Y.
Kidder, Walter M., 127 West 56th St., New York, N. Y.
Lane, H. M. Co., 701 Owen Bldg., Detroit, Mich.
Leonard, Herbert H., Industrial Planning Corp., 80 W. Genesee St., Buffalo, N. Y.
McCall, Brownell & Co. (Inc.), 33 West 42nd St., New York, N. Y.
McDonald-Churchill Corpn., 103 Park Ave., New York, N. Y.
Pogue, Joseph E., 29 Fifth Ave., New York, N. Y.
Scott, Walter Glenn, 52 Vanderbilt Ave., New York, N. Y.
Scovell, Wellington & Co., 110 State St., Boston, Mass.
Scrivenor, Aurthur, Mutual Bldg., Richmond, Va.
Shepard, George H., Purdue University, La Fayette, Ind.
Sutton, Frank W., 4500 Euclid Ave., Cleveland, Ohio
Szepesi Industrial Organization, 678 Boylston St., Boston, Mass.
Wilhelm, J. H. (Inc.), 42 W. 39th St., New York, N. Y.

—Control
Merrick, Dwight V., 34 Gramercy Park, New York, N. Y.

PROMOTION
Pogue, Joseph E., 29 Fifth Ave., New York, N. Y.

PUBLIC UTILITIES
(See also Investigations, Valuation)
Allison, James E. & Co., 1017 Olive St., St. Louis, Mo.
Day & Zimmerman (Inc.), 611 Chestnut St., Philadelphia, Pa.
Jackson, Dugald C., Jackson & Moreland, 387 Washington St., Boston, Mass.
Salisbury, Royal D. Co., 1600 Downing St., Denver, Colo.

Digitized by Google

Stone & Webster (Inc.), 147 Milk St., Boston, Mass.
Vaughan, John F., 185 Devonshire St., Boston, Mass.
White, J. G. Engineering Corpn., 43 Exchange Place, New York, N. Y.
Whiting, Charles W., 148 State St., Boston, Mass.

—Appraisals
Wainright, Arthur V., 49 Wall St., New York, N. Y.

—Management
Offut, M. Webb, Georgetown, Ky.
Stone & Webster (Inc.), 147 Milk St., Boston, Mass.
Wainright, Arthur V., 49 Wall St., New York, N. Y.

—Organizations
Wainright, Arthur V., 49 Wall St., New York, N. Y.

—Regulation
Hoxie, Geo. L., San Fernando, Bldg., Los Angeles, Cal.

PUBLICITY
(See also Advertising)
De Wolfe, E. C., 608 So. Dearborn St., Chicago, Ill.
Hirschberg, Charles Austin (Inc.), 150 Nassau St., New York, N. Y.
Snow, Walter B. & Staff, 60 High St., Boston, 9 Mass.

PULP MILLS
Cannon-Swenson Co., 53 W. Jackson Blvd., Chicago, Ill.
Ferguson, Hardy S., 200 Fifth Ave., New York, N. Y.
Wallace, Joseph H. & Co., 5 Beekman St., New York, N. Y.

PULVERIZED COAL
American Industrial Engrg. Co., Monadnock Block, Chicago, Ill.
Cary, Albert A., 95 Liberty St., New York, N. Y.
Fuller Engineering Co., Allentown, Pa.
Murrie & Co. (Inc.), 74 Broadway, New York, N. Y.
Quigley, W. S., 26 Cortlandt St., New York, N. Y.
Railway & Industrial Engineers (Inc.), 25 Broad St., New York, N. Y.
Renkin, W. O., 26 Courtlandt St., New York, N. Y.

PUMPING PLANTS
Zehr, V. A., Pekin, Ill.

PUMPS
Chester, J. N., 107-1114 Union Bank Bldg., Pitsburgh, Pa.

PURCHASING
Gunn, Carle & Co., 444 Market St., San Francisco, Cal.
Schlank, Elias, 51 Pennsylvania Ave., Newark, N. J.
Thomson, J. Stewart, 95 Liberty St., New York, N. Y.
Tulloss, Joseph C., 11 W. 39th St., New York, N. Y.

Q

QUARRY PLANT
Goldthwaite, Harry W., 618 Seitz Ave., Easton, Pa.

R

RAILROAD (Mechanical)
Ettenger, Robert L., 1800 Pennsylvania Ave. Washington, D. C.
Prout, F. G., 374 Randolph Bldg., Memphis, Tenn.
Seamen, Henry B., 868 Grand Ave., Brooklyn, N. Y.
Waters, W. L., 150 Nassau St., New York, N. Y.

RAILROAD EQUIPMENT
Fuller Engineering Co., Allentown, Pa.
Muhlfeld, John E., 25 Broad St., New York, N. Y.
Railway & Industrial Engineers (Inc.), 25 Broad St., New York, N. Y.

RAILROAD SHOPS
Gilmore, T. N., 186 Liberty St., New York, N. Y.
Lane, Horace H., 2320 Dime Bank Bldg., Detroit, Mich.

RAILROAD STATIONS
Place, Clyde R., Grand Central Terminal, New York, N. Y.

RAILWAY EQUIPMENT
Railway & Industrial Engineers (Inc.), 25 Broad St., New York, N. Y.

REFRACTORY MATERIALS
Pike, Robert D., 74 New Montgomery St., San Francisco, Cal.
Quigley, W. S., 26 Cortlandt St., New York, N. Y.

REFRIGERATION
Baker, C. T., 821 Candler Bld., Atlanta, Ga.
Chatard, Wm. M., 304 Continental Bldg., Baltimore, Md.
Goetz, Victor J., 675 N. 12th St., Philadelphia, Pa.
Haven, H. M. & Crosby, Wm. W. 40 Court St., Boston, Mass.
Luhr, Otto, 154 W. Randolph St., Chicago, Ill.
Posey, James, 925 Fidelity Bldg., Baltimore, Md.
McKee, Thomas C., 431 S. Dearborn St., Chicago, Ill.
Norris, Alexander Murodch, 304 Continental Bldg., Baltimore, Md.
Nusbaum, Lee, 1119-21 N. Howard St., Philadelphia, Pa.
Roekler, H. B., 41 Maiden Lane, New York, N. Y.
Schaphorst, William F., 45 Academy St., Newark, N. J.
Schloss, Newton L., 531 W. 143rd St., Apt. 64, New York, N. Y
Voohrees, Gardner T., 32 West 40th St., New York, N. Y.
Wainright, Arthur V., 49 Wall St., New York, N. Y.

—Fish
Irwin, Oliver C., 50 Church St., New York, N. Y.

—Marine
Irwin, Oliver C., 50 Church St., New York, N. Y.

REINFORCED CONCRETE
Cantell, M. T., 1802 Union Trust Bldg., Winnipeg, Canada
Greydanus, S. E., 112 Ellison St., Cor. Main, Paterson, N. J.
Gunn, Carle & Co., 444 Market St., San Francisco, Cal.
Richmond, Knight C., 10 Weybosset St., Providence, R. I.

REORGANIZATION
Fleming, Henry S., 1 Broadway, New York, N. Y.
Matlack, Ellwood V., 1723 Chicago, Ave., Evanston, Ill.

RESEARCH
(See also Field, Experimental, Fuel)
Abbott, W. G., Jr., Wilton, N. H.
Burrows, Charles W., Grasmere, Borough of Richmond, New York, N. Y.
Gates, Thayer P., 708 Grosvenor Bldg., Providence, R. I.
Greenwood, T. T., 40 Court St., Boston, Mass.
Hopkins, Nevil Monroe, 37 West 44th St., New York, N. Y.

Digitized by Google

RESEARCH (Continued)
Nesbit, Joseph N. G., 2322 8th Ave., New York, N. Y.
Stephens, Phinehas V., 5 Beekman St., New York, N. Y.
Wainright, Arthur V., 49 Wall St., New York, N. Y.
Winestock, Otto C., Perkinsville, Vt.

—Textile
Gates, Thayer P., 708 Grusvenor Bldg., Providence, R. I.

RIVER AND HARBOR IMPROVEMENTS
Bennett, Howard D., 2114 Allendale St., Baltimore, Md.
Massey, Geo. B. Co., Peoples Gas Bldg., Chicago, Ill.

ROLLING MILLS
Ellis, Frank I., Farmers Bank, Bldg., Pittsburg, Pa.

ROUND HOUSES
Gilmore, T. N., 136 Liberty St., New York, N. Y

RUBBER
Hutchens, Edward, 703 Wisconsin St., Eau Claire, Wis
Tomlinson, Malcom C. W., 302 Bushnell Bldg., Springfield, Ohio

S

SAFETY
Banash, J. I., 401 E. 29th St., Chicago, Ill.

SALT WORKS
Cannon-Swentson Co., 53 W. Jackson Blvd., Chicago, Ill.

SANITARY
Allen, Henry D., Room 23-154 W. Randolph St., Chicago, Ill.
Bolles, Frederick N., 80 Boyleston St., Boston, Mass.
Buck, Henry Robinson, Buck & Sheldon, Inc. 60 Prospect St., Hartford, Conn.
Dwyer, James P., Jr., 80 Boylston St., Boston, Mass.
Gerhard, Dr. Wm. Paul, 311 Audubon Ave., New York, N. Y.
Landreth, Olin Henry, 156 Fifth Ave., New York, N. Y.
Landvoight, Thomas E., 104 Municipal Bldg., Washington, D. C.
Schoenijahn Robert P., Industrial Trust Bldg., Wilmington, Del.
Sutton, Frank, 140 Cedar St., New York N. Y.

SAWMILLS
Graham, John L., Reynoldsville, Fla.

SEWAGE DISPOSAL
Chester, J. N., 1107-1114 Union Bank Bldg., Pittsburgh, Pa.
Hill, Nicholas S., Jr., 112 E. 19th St., New York, N. Y.
Posey, James, 925 Fidelity Bldg., Baltimore, Md.
Salisbury, Royal D. Co., 1600 Downing St., Denver, Colo.

SEWERS
Salisbury, Royal D. Co., 1600 Downing St., Denver, Colo.

SHEET METAL STAMPING
Modern Engineering Co., 318 Broadway, New York, N. Y.

SHIP PROPELLERS
U. S. Products Corpn., 1423 McCormick Bldg., Chicago, Ill.

SHOP MANAGEMENT
Hubbard, Harris & Rowell (Inc.), 1047 Broad St., Bridgeport, Conn.

SPECIAL MACHINERY
Abbott, W. G., Jr., Wilton, N. H.
Bentley & Holmgren, 406 Court Exchange Bldg., Bridgeport, Conn.
Buch-Groff Co. (Inc.), 233 Broadway, New York, N. Y.
Dove-Smith & Son, 2255 Niagara Ave., Niagara Falls, N. Y.
Emery, A. H., Glenbrook, Conn.
Hill, Herbert M., 301 Lexington Ave., New York, N. Y.
Modern Engineering Co., 318 Broadway, New York, N. Y.
New Era Machinery Designing Co., 215 Parkway Bldg., Philadelphia, Pa.
Roe, Walter H., Spayth Block, Tiffin, Ohio
U. S. Products Corpn., 1423 McCormick Bldg. Chicago, Ill.
Wilhelm, J. M. (Inc.), 42 W. 39th St., New York, N. Y.

—Textile
Cox, James W. Jr., 320 Broadway, New York, N. Y.
Hill, Herbert M., 301 Lexington Ave., New York, N. Y.

SPRINKLER EQUIPMENT
Posey, James, 925 Fidelity Bldg., Baltimore, Md

SPRINKLERS
Hoagland, I. G., 80 Maiden Lane, New York, N. Y.
Jellett, Stewart A. Co., 1200 Locust St., Philadelphia, Pa.

STANDARDIZATION
Buckley, John H., 30 Church St., Room 1514, New York, N. Y.
Scott, Walter Glenn, 52 Vanderbilt Ave., New York, N. Y.

STATISTICS
Pogue, Joseph E., 29 Fifth Ave., New York, N. Y.

—Production
Polakov, Walter N. & Co. (Inc.), 33 West 42nd St., New York, N. Y.

STEAM
Barrus, Geo H., 12 Pemberton S., Brookline, Mass.

STEAM DRIVEN VEHICLES
U. S. Products Corpn., 1423 McCormick Bldg., Chicago, Ill.

STEAM PLANTS
(See also Testing)
Baxter, Burke M., 5716 Euclid Ave., Cleveland, Ohio
Belcher, P. W., 219 Dooly Block, Salt Lake City, Utah
Brown, Edward C. & Co., 220 Devonshire St. Boston, Mass.
Cary, Albert A., 95 Liberty St., New York, N. Y.
Cherry, Lester A., Industrial Planning Corpn., 80 W. Genessee St., Buffalo, N. Y.
Fermier, E. J., College Station, Texas
Godfrey, Foskett H., 502 Provident Bldg., Tacoma, Wash.
Hill, George F., 51 East 42nd St., New York, N. Y.
Main, Charles T., 201 Devenshire St., Boston, Mass.
Orrok, Geo. A., 124 E. 15th St., New York, N. Y.
Perkins, George H., 134 Batterymarch St., Boston, Mass.
Richardson & Gay, 220 Devonshire St., Boston, Mass.
Sanderson & Porter, 52 William St., New York, N. Y.
Stevens, John A., 8 Merrimack St., Lowell, Mass.
Stevens, R. C., 560 Lincoln Ave., Erie, Pa.
Vaughan, John F., 185 Devonshire St., Boston, Mass.
Wallace, Joseph H. & Co., 5 Beekman St., New York, N. Y.

Digitized by Google

STEEL MILL
Moore, W. E. & Co., Union Bank Bldg., Pittsburgh, Pa.

STEEL TOWERS (Tubular)
Moore, Lee C. & Co. (Inc.), 1021-27 Mayo Bldg., Tulsa, Okla.

STOKERS, PULVERIZER COAL
Fuller Engineering Co., Allentown, Pa.

STORAGE BINS (Concrete)
Deverell, Spencer & Co. (Inc.), 514-517 Garrett Bldg., Baltimore, Md.

STRUCTURAL
Baldwin, Bert L., 1201-4 Second Natl. Bank Bldg., Cincinnati, Ohio
Cantell, M. T., 1302 Union Trust Bldg., Winnipeg, Canada
Chapin, Warren W., 347 Madison Ave., New York, N. Y.
Curry, John R., Astna Trust Bldg., Indianapolis, Ind.
Greydanus, S. E., 112 Ellison St. cor. Main, Paterson, N. J.
Phelps, Frederick A., 920 Union Bldg., Newark, N. J.
Richmond, Knight C. ,10 Weybosset St., Providence, R. I.
Swain, Geo. F., Harvard University, Cambridge, Mass.
Westcott & Mapes, 207 Orange St., New Haven, Conn.

—Designing
Cooley-Marvin Co, 15 Ashburton Place, Boston, Mass.

—Tubular Steel
Moore, Lee C. & Co. (Inc.), 1021-27 Mayo Bldg., Tulsa, Okla.

SUBWAYS
Seaman, Henry B., 363 Grand Ave., Brooklyn, N. Y.

SUGAR FACTORIES
Cannan Swenson Co., 53 W. Jackson Blvd., Chicago, Ill.
Saldana, Edwardo E., Central "Vaunine", Rio Piedras, Puerto, Rico
T-S-M-E-Engineering Corpn., Iroquois Bldg., Buffalo, N. Y.
Virkess, Samuel, 129 Front St., New York, N. Y.

—Beet
Honolulu Iron Works Co., Woolworth Bldg., New York, N .Y.

—Cane
Beranger, Jos. P., West India Sugar Finance, Corpn., 129 Front St., New York, N. Y.
Honolulu Iron Works Co., Woolworth Bldg., New York, N. Y.
Kent, Robert Sayre (Inc.), 50 Court St., Brooklyn, N. Y.

—Electrification
Adams, Comfort A., 38 West 39th St., New York, N. Y.

SUGAR MACHINERY
Honolulu Iron Works Co., Woolworth Bldg., New York, N. Y.
Viola, Bartholomew, 309 Broadway, New York, N. Y.

SUGAR REFINERIES
Kent, Robert Sayre (Inc.), 50 Court St., Brooklyn, N. Y.

T

TANNERIES
Brown, Edward C. & Co., 220 Devonshire St., Boston, Mass.

TAX ACCOUNTING
Cooley & Marvin Co., 15 Ashburton Place, Boston, Mass.
Kennedyfi, William P., 1767 Broadway at 57th St., New York, N. Y.

TESTING
—Fuel
Uehling, F. F., Empire Bldg., New York, N. Y.

—Gas
Fink, J. B., 527 Robinson Bldg., Tulsa, Okla.
Uehling, F. F., Empire Bldg., New York, N. Y.

—Hydraulic Turbine
Allen, Charles M., Worcester Polytechnic Inst., Worcester, Mass.

—Laboratory
Christie, A. G., Johns Hopkins University, Baltimore, Md.
Electrical Testing Laboratories, 80th St. & East End Ave, New York, N. Y.
Gebhardt, G. F., Armour Inst. of Tech., Chicago, Ill.
Mudge, Sterling W., Pratt Institute, Brooklyn, N. Y.

—Materials
Conard, William R., 322 High St., Burlington, N J.
Fermier, E. J., College Station, Texas

—Steam Plants
Cary, Albert A., 95 Liberty St., New York, N. Y.
Gebhardt, G. F., Armour Inst. of Tech., Chicago, Ill.

TESTING MACHINES
Emery, A. H., Glenbrook, Conn.

TEXTILE MILLS
Cox, James W., Jr., 320 Broadway, New York, N. Y.
Gates, Thayer P., 7-8 Grosvenor Bldg., Providence, R. I.
Perkins, George H., 134 Batterymarch St., Boston, Mass.
Richmond, Knight C., 10 Weybosset St., Providence, R. I.
Schlank, Elias, 51 Pennsylvania Ave., Newark, N. Y.
Szepesi Industrial Organization, 673 Boylston St., Boston, Mass.

THERMODYNAMICS
Webster, Arthur Gordon, 85 William St., Worcester Mass.

TOOL DESIGNING
Cundall, Robert N., Industrial Planning Corpn., 80 W. Genesee St., Buffalo, N. Y.
Dove-Smith & Son, 2255 Niagara Ave., Niagara Falls, N. Y.
Dowd Engineering Co., 131 West 39th St., New York, N. Y.
Fassett, Francis K., 1302-1303 U. B. Bldg., Dayton, Ohio
Hubbard, Harris & Rowell (Inc.), 1047 Broad St., Bridgeport, Conn.
Mayo, Edward H., 412 Traction Terminal Bldg., Indianapolis, Ind.
Modern Engineering Co., 318 Broadway, New York, N. Y.
New Era Machinery Designing Co., 215 Parkway Bldg., Philadelphia, Pa.
Tulloss, Joseph C., 11 W. 39th St., New York, N. Y.

TOWERS
—Oil Well
Moore, Lee C. & Co. (Inc.), 1021-27 Mayo Bldg., Tulsa, Okla.

—Portable
Moore, Lee C. & Co. (Inc.), 1021-27 Mayo Bldg., Tulsa, Okla.

—Tubular Steel
Moore, Lee C. & Co. (Inc.), 1021-27 Mayo Bldg., Tulsa, Okla.

TRACKLESS TROLLEYS
Rossman, J. G., Scotch Plains, N. J.

TRACTORS
Dodge, Adiel Y., Room 214, Badger Bldg., Racine, Wis.

Digitized by Google

TRACTORS (Continued)
Myers, Cornelius T., Rahway Natl. Bank Bldg., Rahway, N. J.
U. S. Products Corpn., 1423 McCormick Bldg., Chicago, Ill.

TRADE SURVEYS
Brill, George M., 2607 Singer lBdg., New York, N. Y.

TRAMWAYS (Wire Rope)
Newell, Wallace L., 1017 Alaska Building, Seattle, Washington

TRANSPORTATION
Donnely, William T., 17 Battery Place, New York, N. Y.
Swain, Geo. F., Harvard University Cambridge, Mass.

—Automobile
Kennedy, Wiliam P., 1767 Broadway, at 57th St., New York, N. Y.

TUBES (Cardboard)
Hatch, Edwin G., 220 Broadway, New York, N. Y.

TUNNELS
Moran, Daniel E., Moran, Maurice & Proctor, 55 Liberty St., New York, N. Y.
Thomson, T. Kennard, 50 Church St., New York, N. Y.

V

VALUATION
(See also Appraisals)
Anderson, A. C., 524-6 Bee Bldg., Omaha, Neb.
Basinger, James Garnett, 22 Wiliam St., New York, N. Y.
Carse, David B., International Engrg. & Financing Corp., 111 Broadway, New York, N. Y.
Cooley-Marvin Co., 15 Ashburton Place, Boston, Mass.
Fassett, Francis K., 1302-1303 U. B. Bldg., Dayton, Ohio
Hoxie, Geo. L., San Fernando Bldg., Los Angeles, Cal.
Hubbard, Harris & Rowell (Inc.), 1047 Broad St., Bridgeport, Conn.
Landreth, Olin Henry, 156 Fifth Ave., New York, N. Y.
Leonard, David E., 608 East 105th St., Cleveland, Ohio
Little, Arthur D. (Inc.), 30 Charles River Rd., Cambridge, Mass.
Mullergren, Arthur L., Firestone Bldg., Kansas City, Mo.
Railway & Industrial Engineers (Inc.), 25 Broad St., New York, N. Y.
Sanderson & Porter, 52 William St., New York, N. Y.
Spackman, Henry S., 2024 Arch St., Philadelphia, Pa.
Swain, Geo. F., Harvard University, Cambridge, Mass.
Tyng, Arthur, 810 Iroquois Bldg., Buffalo, N. Y.

—Industrial Plants
Richmond, Knight C., 10 Weybosset St., Providence, R. I.

—Public Utilities
Allison, James E. & Co., 1017 Olive St., St. Louis, Mo.

VALVES
Steere Engineering Co., Woodward & Horton Aves., Detroit, Mich.

VAULTS
Holmes, Frederick S., 2 Rector St., New York, N. Y.

VENTILATING
(See also Heating and Ventilating, Paper Mills)
Anderson, A. C., 524-6 Bee Bldg., Omaha. Neb.
Goubert, Aug. A., 90 West St., New York, N. Y.
Landvoigt, Thomas E., 104 Municipal Bldg., Washington, D. C.

VIBRATIONS
Webster, Arthur Gordon, 85 William St., Worcester, Mass.

W

WASTE ELMINATION
Tomlinson, Malcolm C. W., 302 Bushnell Bldg., Springfield, Ohio

WASTE HEAT
American Industrial Engrg. Co., Monadnock Block, Chicago, Ill.
Brown, John Wilson, Jr., 1213 Filbert St., Philadelphia, Pa.
Bunnell, Sterling H., 103 Park Ave., New York, N. Y.
Fuller Engineering Co., Allentown, Pa.

WASTE UTILIZATION
Lewis, D. J., Jr., Woolworth Bldg., New York, N. Y.

WATER SUPPLY
Hill, Nicholas S., Jr., 112 E. 19th St., New York, N. Y.
Wainright, Arthur V., 49 Wall St., New York, N. Y.

WATER SUPPLY SYSTEMS
Rice, Cyrus Wm., 63rd & Woodland Ave., Philadelphia, Pa.
Wood, Albert C., 1203 Stock Exchange Bldg., Wynnefield, Philadelphia, Pa.

WATER WORKS
Cantell, M. T., 1302 Union Trust Bldg., Winnipeg, Canada
Chester, J. N., 1107-1114 Union Bank Bldg., Pittsburgh, Pa.
Holland, Ackerman & Holland, 106 E. Liberty St., Ann Arbor, Mich.
Koebig, A. W., 841 Title Insurance Bldg., Los Angeles, Cal.
Salisbury, Royal D., 1600 Downing St., Denver, Colo.

—Machinery
Belcher, P. W., 219 Dooly Block, Salt Lake City, Utah

WELDING
Posey, James, 925 Fidelity Bldg., Baltimore, Md.
Smith, H. S., 30 E. 42nd St., New York, N. Y.

—Electric
Adams, Comfort A., 33 West 39th St., New York, N. Y.
Sessions, Frank L., 422 Kirby Bldg., Cleveland, Ohio

—Oxy-Acetylene
Smith, H. S., 30 E. 42nd St., New York, N. Y.

WIRE MILLS
American Industrial Engrg. Co., Monadnock, Block, Chicago, Ill.

WIRING, ELECTRIC
Tulloss, Joseph C., 11 W. 39th St., New York, N. Y.

WOOD DISTILLATION
Cannon-Swenson Co., 58 W. Jackson Blvd., Chicago, Ill.

WOODWORKING MACHINERY
Neale, William McC., P. O. Box 351, Greensboro, North Carolina

WORK ROUTING
Hubbard, Harris & Rowell (Inc.), 1047 Broad St., Bridgeport, Conn.
Walter Engineering Co., 216 Ludlow Bldg., Dayton, Ohio

WRAPPING MACHINERY
Hill, Herbert M., 301 Lexington Ave., New York, N. Y.

Digitized by Google

Digitized by Google

Digitized by Google

R 2/15 15

Digitized by Google

UNIVERSITY OF MINNESOTA
sci,pere v.11

Condensed catalogues of mechanical equip

3 1951 000 869 265 C

Minnesota Library Access Center
9 ZA R02 D29 S15 TJ7